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A 68.6/2: 989



United States
Department of
Agriculture

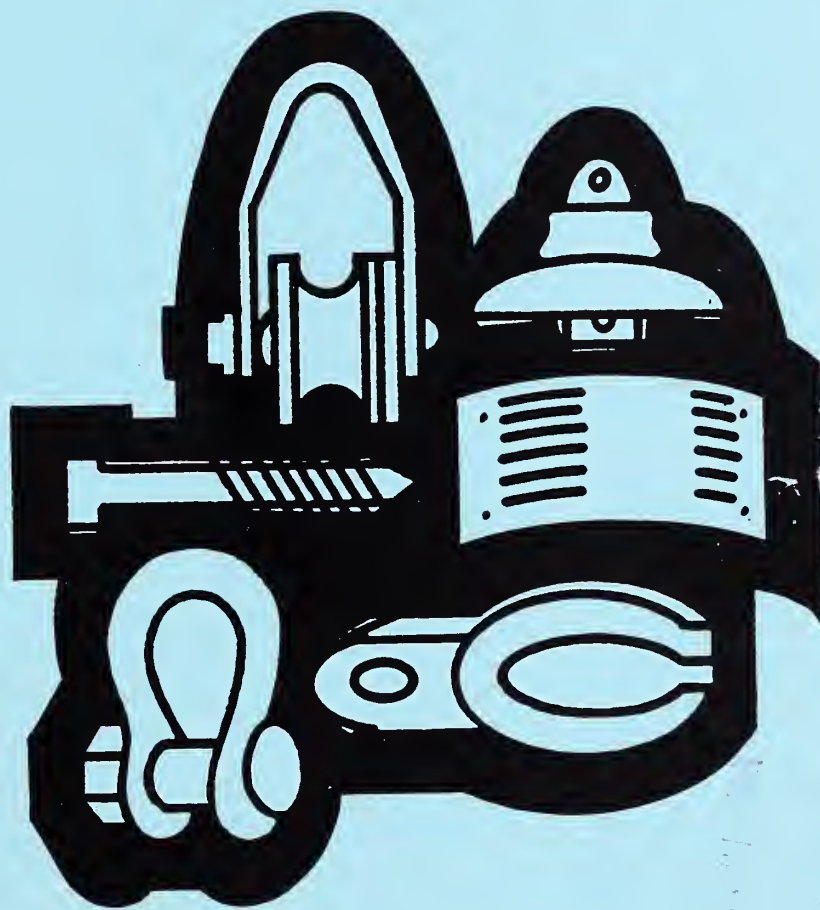
Rural
Electrification
Administration

REA
Bulletin
43-5

List of Materials

Acceptable for Use on Systems
of REA Electrification Borrowers

(Serial)



Gal 12

July 1989

PREFACE

This list supersedes all preceeding issues including revisions. Revised sheets reflecting changes in the list will be issued quarterly and should be inserted in order to keep your copy up to date.

The items shown in this publication include material and equipment for transmission and distribution facilities and specific items of electric general plant. Items not listed include office equipment, tools and work equipment, and consumer owned wiring facilities. The listings apply only to new items of material and equipment and not to used items.

In addition to items accepted on a general basis, this list also includes items accepted on a conditional basis. As one of the conditions in the listing of an item on a conditional basis, contractors are required to obtain the borrower's concurrence prior to its use.

The inclusion of an item in this list does not indicate that that item's manufacturer or its principals have not been debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded pursuant to Executive Order 12549, Debarment or Suspension, or any rules or regulations issued thereunder, including 7 CFR Part 3017 ("Debarment Regulations"). Therefore, borrowers must comply with the requirements imposed by the Debarment Regulations before entering into any "covered transaction", as defined by 7 CFR Part 3017, involving any item on this list.

The acceptance of an additional item or the deletion of an existing item is a function of the Technical Standards Committees. Any manufacturer desiring to have a new item placed on the list, or any user believing an existing item should be removed from the list, is invited to submit the matter to the Committees. Any communication calling attention to an error or omission in the list, such as a wrong catalog number, an obsolete item, etc., will be appreciated. All communications should be addressed to Technical Standards Committee "A" (Electric), Rural Electrification Administration, U. S. Department of Agriculture, Washington, D. C. 20250.

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a - Insulator, pin type

Specifications

5 kV - used on 2.4 kV and
4.16/2.4 kV systems



	Plain	Radio- freed
ANSI Class 55-2		
Flashover, dry	50 kV	45 kV
Flashover, wet	25 kV	25 kV
Leakage distance	5 in.	5 in.
Pinhole diameter	1 in.	1 in.

Chance	C905-1302*
**Cooper Power Systems (McGraw-Edison)	NP8D8*
Porcelain Products (Knox)	.253
Victor Insulators, Inc.	8

12.5/7.2 kV - used on 12.5/7.2
and 13.2/7.62 kV systems



	Plain	Radio- freed
ANSI Class 55-3		
Flashover, dry	65 kV	55 kV
Flashover, wet	35 kV	30 kV
Leakage distance	7 in.	7 in.
Pinhole diameter	1 in.	1 in.

Chance	C905-1303*
Cooper Power Systems (McGraw-Edison)	NP9D8*
Joslyn (Pinco)	L63R*
Porcelain Products (Knox)	261-S*
Victor Insulators, Inc.	5*

15 kV - used on 12.5/7.2
and 13.2/7.62 kV systems where
greater insulation is needed



	Plain	Radio- freed
ANSI Class 55-4		
Flashover, dry	70 kV	65 kV
Flashover, wet	40 kV	35 kV
Leakage distance	9 in.	9 in.
Pinhole diameter	1 in.	1 in.

Chance	C905-1304*
Cooper Power Systems	NP21D8*
Joslyn (Pinco)	L2064R*
Porcelain Products (Knox)	366-S*
Victor Insulators, Inc.	6*

*Radio-freed

**Available in white as indication of neutral. White insulators are non-radio-freed.

Radio-freed and non-radio-freed insulators made by these manufacturers and in these styles are acceptable.

NOTE: Post insulators (Item ea) may be substituted for the crossarm pin (Item f) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.

a-2
July 1989

a - Insulator, pin type
(Radio-freed)

Specifications

Used on 24.9/14.4 kV
distribution lines.

Radio noise free, metal
thimble



ANSI Class 56-1
Flashover, dry 95 kV
Flashover, wet 60 kV
Leakage distance 13 in.
Pinhole diameter 1-3/8 in.

Chance	C906-1311
Joslyn (Pinco)	L1123-R
Porcelain Products (Knox)	1027-S
Victor Insulators, Inc.	127-R

Used on 33 - 34.5 kV
transmission lines.

Metal thimble



ANSI Class 56-3
Flashover, dry 125 kV
Flashover, wet 80 kV
Leakage distance 21 in.
Pinhole diameter 1-3/8 in.

Chance	C906-1303
Joslyn (Pinco)	L75-R
Porcelain Products (Knox)	2045-S
Victor Insulators, Inc.	245-R

Used on 44 - 46 kV
transmission lines.

Metal thimble



ANSI Class 56-4
Flashover, dry-wet 140-95 kV
Leakage distance 27 in.
Pinhole diameter 1-3/8 in.

Victor Insulators, Inc.	255-R
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NOTE: Post insulators (Item ea) may be substituted for the crossarm pin (Item f) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.

Conditional List
a(1)
July 1989

a - Insulators, pin type
(Radio-freed)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
*Chance C906-1321 24.9/14.4 kV ANSI Class 56-1	1274 2/9/84	To obtain experience.
*Cooper Power Systems (McGraw-Edison) NP2T8 24.9/14.4 kV ANSI Class 56-1	1205 2/5/81	To obtain experience.
*Porcelain Products (Knox) 1027-ST 24.9/14.4 kV ANSI Class 56-1	1321 5/29/86 1334 1/15/87	To obtain experience.
*Victor Insulators, Inc. 27R 24.9/14.4 kV ANSI Class 56-1	1235 5/27/82 1334 1/15/87	To obtain experience.

*Does not have metal thimble.

NOTE: Post insulators (Item ea) may be substituted for the crossarm pin (Item f) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.

b
July 1989

b - Pin, pole top, steel

DISTRIBUTION

	<u>12.5/7.2 or 13.2/7.62 kV</u>	<u>24.9/14.4 kV</u>
Pin length, inches :	20	20
Thread diameter, inches:	1	1-3/8
Hole spacing, inches :	8	8
REA Specifications :	D-3	DT-3
Chance	2199	2195
Cooper Power Systems (McGraw-Edison)	DP19P6	DP19P5
Dixie	D-2172-R	D2195-R
Joslyn	J740	J720
Kortick		K8086
Utilities Service	36606F-REA	36652

Pins listed below have 4-1/2" offset
which eliminates the use of Item cs

Chance	C2060271
Cooper Power Systems (McGraw-Edison)	DP28P1
Joslyn	J25179
Utilities Service	36549

TRANSMISSION

Type :	
Pin Length, inches :	24
Thread diameter, inches :	1-3/8
Hole spacing, inches :	8
REA Specifications :	DT-3
Chance	2196
Cooper Power Systems (McGraw-Edison)	DP19P8
Joslyn	J824
Kortick	K8087
Utilities Service	36653F

NOTE 1. Pole top bracket (Item eb) and post insulator (Item ea) may be substituted for pole top pin (Item b) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.

2. Flared type pins may be mounted with either side against the pole.

c - Bolt, machine

Applicable Specification: ANSI C135.1,
"Standards for
Galvanized Steel Bolts and
Nuts" except that the lengths
are in the ranges given below.

Applicable Sizes : 1/2 inch diameter, 6 through
10 inch length

5/8 inch diameter, 6 through
24 inch length

3/4 inch diameter, 6 through
26 inch length

7/8 inch diameter, 6 through
28 inch length

The following manufacturers have shown compliance with the applicable
specifications for machine bolts:

A. B. Chance Company
*Cooper Power Systems
(McGraw-Edison)
Dixie Electrical Manufacturing Company
Florida Wire and Cable Supply Division
Hughes Brothers
*Joslyn Manufacturing Company
Kortick Manufacturing Company
*Portland Bolt & Manufacturing Company
Power Line Hardware
The Rockford Bolt & Steel Company
Steel City Bolt & Screw Co., Inc.
Utilities Service Company



*"Static proof" design available.

d
July 1989

d - Washers
FLAT ROLLED STEEL

Size, inches:	2-1/4x2-1/4	3 x 3	4 x 4	4 x 4	1-3/8 round	1-3/4 round
Thickness, in.:	3/16	1/4	3/16	1/2	12 gauge	10 gauge
Hole Diam., in.	13/16	13/16	13/16	13/16	9/16	11/16
C & C Spacer	4					
Chance	6814	6817	6818	6819-1/2	6803	6805
Cooper (McGraw-Edison)	DF2W5	DF2W7	DF2W10	DF2W15	DF1W2	DF1W3
Dixie	D6814	D6817	D6818	D6819-1/2	D6803	-
FWC	FW1076		FW1080		FW1086	FW1088
Hughes	SW2-70	SW3-70	SW4-70	SW4-70(1/2)	RW1-3/8-50	-
Joslyn	J1076	J1079	J1080	J1473	J1086	J1088
Kortick	K1553	K1555	K1557	K1559-1/2	K1524	K1525
Power Line Hardware	SWF225A	SWF33B	SWF44A	-	-	-
Utilities Service	5485	5487A	5488	5490A	5478	5479

CURVED CAST

Size, inches:	2-1/4x2-1/4	3 x 3	3 x 4	4 x 4
Thickness, in.:	1/4	5/16	7/16	1/2
Hole Diam., in.:	11/16	11/16	15/16	13/16
American Connector (A)		CW 33-5	CW 34-7	CW 44-6
Barron Bethea (N)	GCW-1A	GCW-31	CRW-4A	GCW-41
Continental (N)	-	CW-33-5	CW-34-7	CW-44-6
Flagg (MIF)(M)	P141	P143	P120	P144
Power Line Hardware (M)		CSW-33	CRW-34	CSW-44
Reliable/Bethea (A)	-	WC-33-5	WC-34-7	WC-44-6
Universal Electric (A)	UW-225	UW-335	UW-347	UW-446

CURVED ROLLED STEEL

Joslyn (Steel) J114

FLAT CAST

Barron Bethea (N) BB-214
Flagg (MIF) (N) P56A

SPURRED

3" Round, 3/16" Thick, 13/16" Hole

Continental (N) TCSF-30-6
Flagg (MIF) (M) PX159A

(A) Aluminum Alloy
(M) Malleable Iron
(N) Nodular Iron

f - Pin, crossarm
(With square washer, nut and MF locknut)

DISTRIBUTION

Thread (inches diam.)	1	1-3/8	1	1-3/8
Length above base (in.)	5	7	5	7
Length below base (in.)	5-3/4	7	1-1/2	1-3/4
Shank (inches diam.)	5/8	5/8	5/8	3/4

	<u>Long Shank</u>		<u>Short Shank</u>	
Chance	881	4717	886	-
Cooper Power Systems (McGraw-Edison)	DP2S1*	DP3T1*	DP2S37*	DP5T22*
Dixie	D881	-	-	-
Joslyn	J203*	J647*	J221*	J630*
Kortick	K7104	K7611	K7122	K7631
Utilities Service	558	3137A	579	3142

Clamp Type Pin

Thread (inches diam.)	1	1-3/8
Length above base (in.)	5-3/4	7
Chance	14322	14322-1
Cooper Power Systems (McGraw-Edison)	DP2C1	DP2C11
Dixie	D3322	D3324
Joslyn	J3322	J3324



Washer Plate for Clamp Type Pin

These plates are equipped with lugs to prevent slippage of pin along crossarm. They may be used to replace the bottom plate on pins already installed.

Chance	450091
Cooper Power Systems (McGraw-Edison)	DP9X1
Joslyn	J3322-P

*"Static proof" designs available.

f-2
July 1989

f - Pin, crossarm
(With square washer, nut and locknut)

TRANSMISSION

Thread (inches diameter)	1-3/8	1-3/8
Length above base (inches)	10	10
Length below base (inches)	7	1-3/4
Shank (inches diameter)	3/4	3/4
	<u>Long Shank</u>	<u>Short Shank</u>
Chance	4332	-
Cooper Power Systems (McGraw-Edison)	DP7T9*	DP5T24*
Joslyn	J610*	J633*
Kortick	K7643	K7635
Utilities Service	3140	3145

* "Static proof" designs available.

h
July 1989

h - Brace, crossarm, steel

Wherever item h is shown on a construction drawing,
use a brace from page cu.

i
July 1989

i - Bolt, carriage

Applicable Specification: ANSI C135.1, "Standards for
Galvanized Steel Bolts and
Nuts."

Applicable Sizes : 3/8 inch diameter, 3 through
6 inch length

1/2 inch diameter, 3 through
6 inch length

The following manufacturers have shown compliance with the applicable
specifications for carriage bolts.

A. B. Chance Company
Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company
Florida Wire and Cable Supply Division
Hughes Brothers
Joslyn Manufacturing Company
Kortick Manufacturing Company
The Rockford Bolt & Steel Company
Utilities Service Company



j
July 1989

j - Screw, lag

Applicable Specifications: Edison Electric Institute
Specification TDJ-3 1964,
"Standards for Lag Screws"

Applicable Sizes : 1/2 inch diameter, 4 inch length
1/2 inch diameter, 5 inch length
5/8 inch diameter, 4 inch length
5/8 inch diameter, 5 inch length

The following manufacturers have shown compliance with the applicable specifications for lag screws:

A. B. Chance Company
Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company
Joslyn Manufacturing and Supply Company
Kortick Manufacturing Company
Utilities Service Company



k-1
July 1989

k - Insulators, suspension

ANSI Class	52-9	52-1	52-4	52-3
Type	Clevis	Clevis	Clevis	Ball & Socket
Disc Diameter	4-1/4"	6"	9" or 9-1/2"	9" or 9-1/2"
M & E Rating, lbs.	10,000	10,000	15,000	15,000
Leakage, inches	6-3/4	7	11-1/2	11-1/2
Flashover; kV: Dry-Wet	60 - 30	60 - 30	80 - 50	80 - 50
NOTES	(3)(4)	(3)(4)	(5)	(2)

<u>Manufacturer</u>	<u>Catalog Number</u>			
Chance	C907-1009	C907-1001	-	-
Joslyn (Pinco)	L1814	L1510	L-970	L-960
Lapp	-	-	9100	9000
Locke	16044	16583	15S410	15S409
Porcelain Prod. (Knox)	84300	86012	-	-
Sediver	CT-4R2-M	-	-	-
Victor Insulators, Inc.	817	804	-	-

Notes:

- (2) To be used only on transmission lines.
- (3) To be used only on distribution lines.
- (4) Use two insulators for 12.5/7.2 kV deadends and three insulators for 24.9/14.4 kV deadends.
- (5) Use two insulators for 24.9/14.4 kV deadends.

k-2
July 1989

k - Insulators, suspension

ANSI Class	52-3	52-4	52-5	52-6
Type	Ball & Socket	Clevis	Ball & Socket	Clevis
Disc Diameter	10"	10"	10"	10"
M & E Rating, lbs.	15,000	15,000	25,000	25,000
Leakage, inches	11-1/2	11-1/2	11	11
Flashover: kV: Dry-Wet	80 - 50	80 - 50	80 - 50	80 - 50
NOTES	(2)	(1)	(2)	

Manufacturer

Catalog Number

ICI (Pinco)	L1060	L1070	L1500	L1570
Lapp	8200	8100	301425	2300
Locke	20S840	20S580	30S255	30S257
Porcelain Prod. (Knox)	81022	81012	-	-
Sediver	-	CT-8R2	-	-

Notes: (1) Use two for 24.9/14.4 kV deadends.
(2) To be used only on transmission lines.



Conditional List
k(2)
July 1989

k - Insulator, Suspension

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Sediver</u>		
10" suspension insulator	997(7/27/72)	To obtain experience.
N-8R2 (ball & socket, 20,000 lbs.)	1068(6/26/75)	
CT-14R2 (clevis, 30,000 lbs.)	1186(5/8/80)	Same as above.
N-14R2 (ball & socket, 30,000 lbs.)	1175(11/2/79)	
	1297 (4/11/85)	

k - Insulator, Distribution Deadend

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Distribution deadend	965	1. To obtain experience
Type E		
Model No. C654-3015 (15kV)	1386	2. For use as deadends on
Model No. C654-3025 (25kV)	6/29/89	distribution lines only
Model No. C654-3034 (35kV)		3. Not recommended for use
		in areas subject to
		contamination.
<u>Joslyn</u>		
Distribution deadend	1074	For use as deadends on
UDI 671-3002	9/25/75	distribution lines only
	1088	up to 15 kV line-to-
Distribution deadend	4/15/76	line voltage.
UDI 671-3010	1074	
	9/25/75	For use as deadends on
	1088	distribution lines only
	4/15/76	up to 25 kV line-to
		line voltage.
<u>Lapp</u>		
Distribution deadend	1282	1. To obtain experience.
Catalog No. 151001, 15kV	6/21/84	2. For use as deadends on
Catalog No. 151002, 25kV		distribution lines only.
		3. Recommended maximum
		working load is 5,000
		lbs.
		4. Not recommended for use
		in areas subject to
		contamination.

NOTE: When insulators from this page are used, adjust construction drawing material list quantities as necessary.

Conditional List
k(3.1)
July 1989

k - Insulator, Distribution Deadend

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Ohio Brass Type PDI-15 (15 kV) "Veri*Lite"	1347 (8/13/87)	1. To obtain experience. 2. For use as deadends on distribution lines only. 3. Not recommended for use in areas subject to contamination.
Tranpol Distribution deadend H-15 kV-4 H-25 kV-6	1158 3/1/79 1208 3/19/81	1. To obtain experience 2. For use as deadends on distribution lines only 4. Not recommended for use in areas subject to contamination.
Salisbury Distribution deadend 9501 Series, 15 kV 9502 Series, 25 kV	1226 (1/7/82) 1304 (8/8/85) 1291 (12/20/84)	Same as Lapp [See Cond. k(3)]
Sediver Distribution deadend ADI-4 15 kV ADI-6 25 kV ADI-8 35 kV	1286 (9/6/84)	Same as Lapp [See Cond. k(3)]

NOTE: When insulators from this page are used, adjust construction
drawing material list quantities as necessary.

1-1
July 1989

1 - Clamp, deadend

DISTRIBUTION

Copper 2 through 6 CWC 4A through 8A		ACSR (Aluminum Clamps)			
		4/0 & 3/0	2/0	1/0	2 & 4
-	ALCOA	302	302	302	302
-	American Connector Engineering	QDA-63	QDA-53	QDA-53	QDA-53
MD-52-N	Anderson/Sq.D		PG46C	PG-46C	PG-46C
-	Continental	AQD-63	AQD-52	AQD-52	AQD-52
-	C & R	CR-20-90	CR-10-90	CR-10-90	CR-10-90
-	Lapp	306120N	306118N	306118N	306118N
-	Reliable/Bethea	DA-20N	DA-15-N	DA-15-N	DA-15-N

1-2
July 1989

1 - Deadend for Steel Strand (Overhead Ground Wire)

TRANSMISSION

For High Strength Steel Strand and Aluminum-Clad Steel Strand

Clamp Type

<u>High Strength Steel</u>		<u>Aluminum-Clad Steel</u>		
<u>Manufacturer</u>	<u>3/8" and 7/16"</u>	<u>7 No. 9 AWG</u>	<u>7 No. 8 AWG</u>	<u>7 No. 7 AWG</u>
Anderson/Sq. D	SWDE-55N			
Continental	FQD-55-3-LW			
Reliable/Bethea	FD-550-N (For use on 3/8" steel strand only)			

1 - Deadend for steel strand (overhead ground wire)

TRANSMISSION

For high strength, extra high strength steel strand and aluminum clad steel str and

Manufacturer	<u>Compression Type</u>				Extra High Strength 5/16" 3/8" 7/16"
	High Strength Steel 3/8"	7/16"	Aluminum-clad steel 7 No. 9 AWG 7 No. 8 AWG 7 No. 7 AWG		
Alcoa	4620.12	4627.14			
Burndy	YTW375E	YTW438E	YTW7M9T	YTW7M8T	YTW7M7T
Fargo	861255	861430	861225	861227	861430
Homac	Order by wire size and type				861022 861225 861430

Formed Type*

Chance	16M-AWTLG	20M-AWTLG
Helical Line Prod.	HG210-3/8 HG211-7/16 HG523-12.5M	HG528-20M HG209-5/16 HG210-3/8 HG211-7/16

* Class B galvanizing. When overhead groundwire has Class C galvanizing, formed deadend should also have Class C galvanizing.

Automatic Type

Fargo	GDE-302	GDE-303	GDE-302	GDE-303	GDE-301 GDE-302 GDE-303
Reliable	5202	5203	5202	5203	5201 5202 5203

Conditional List
1(1)
July 1989

1 - Clamp, deadend

DISTRIBUTION

2-Bolt Straight Line, Aluminum Alloy

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>*American Connector Engineering</u> Aluminum alloy deadend Catalog No. SDA 53 (#4-3/0 ACSR)	1338 (4/2/87)	(a) To obtain experience (b) Applications limited to replacements under hot line conditions.
<u>*Anderson/Square D</u> Aluminum alloy deadend Catalog No. ADS-48-N (2/0 ACSR) Catalog No. ADS-60-N (3/0 ACSR)	1130 (1/5/78) 1148 (9/28/78)	(a) To obtain experience (b) Applications limited to replacements under hot line conditions.
<u>*Barron Bethea</u> Aluminum alloy deadend Catalog No. SDF-10A (4 through 4/0 ACSR)	871 (7/6/67)	Same as above.
<u>*Burndy</u> Aluminum alloy deadend Catalog No. CUW26RE-1 #2-2/0 Str. Aluminum #4-2/0 ACSR	1255 (3/24/83)	Same as above.

*Straight line deadend clamps are applicable for urban construction where tensions are moderate and on lines often worked hot.

1 - Clamp, deadend

DISTRIBUTION

2-Bolt Straight Line, Aluminum Alloy

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>*C & R Products</u>		
Catalog No. CRDE-10-180 (No. 4 thru No. 2/0 ACSR)	918 (5/15/69) 1331 (11/20/86)	(a) To obtain experience. (b) Applications limited to replacements under hot line conditions.
Catalog No. CRDE-20-180 (No. 3/0 and No. 4/0 ACSR)		
<u>*Continental</u>		
Aluminum Alloy deadend Catalog No. HDSO-57 (with side opening) (4-4/0 ACSR)	1244 (10/7/82)	Same as above.
Catalog No. SGA-52-23 (4-2/0 ACSR)		
Catalog No. SGA-60 (3/0-4/0 ACSR)		
<u>*Fargo</u>		
Aluminum alloy deadend Catalog No. GD-961A side opening keeper (No. 4 and No. 2 ACSR)	1258 (5/5/83) 1144 (8/3/78)	Same as above.
Catalog No. GD-972A (2/0, 3/0, 4/0 ACSR)	791 (4/30/64)	
<u>*Reliable/Bethea</u>		
Aluminum alloy deadend Catalog No. ASO-684-2 (1/0, 2/0, 3/0 ACSR)	961 (2/18/71)	Same as above.
Catalog No. ASD-2-N (4-2/0 ACSR)	1201 (12/4/80)	Same as above.
Catalog No. ASD-34-N 3/0, 4/0 ACSR	1371 (10/6/88)	Same as above.

*Straight line deadend clamps are applicable for urban construction where tensions are moderate and on lines often worked hot.

m-1
July 1989

m - Clamp, suspension

2 BOLT - DISTRIBUTION

	<u>Copper & CWC</u> 6240	<u>ACSR with 4</u> 6241	<u>Straight or 2</u> 6242	<u>Formed 1/0 & 2/0</u> 6243	<u>Armor Rods 3/0 & 4/0</u> 6244
ABB					
American Connector	FLS-53	ALS-62	ALS-62	ALS-86	ALS-105
Anderson/Square D	MS-46-N	MS-60-N	MS-70-N	HAS-85-N	HAS-104-N
Barron Bethea	FWG-1	FWG-2	FWG-3	FWG-4	-
C & R Products	-	-	-	CRSC-1	CRSC-2
Continental Electric	FSC-46-N	FSC-60-N	SC-70-N	SC-85-N	SC-105-N
Dulmison	-	-	-	-	HSU*
Lapp	305740N	306027N	306028N	306029N	306030N
Preformed	-	-	-	-	AGS*
Reliable/Bethea	FS-46-N	GW-1-N	LS-0-N	LS-1-N	LS-2-N

*Accepted for larger sizes.

m - Clamp, Suspension

ANGLE - DISTRIBUTION
No. 2 & 4 ACSR
Plus Rods

2-BOLT TRANSMISSION
For 3/8" Steel Overhead
Ground Wire

2300	ABB	6240
-	American Connector	FLS-53
AAC-68-90	Anderson/Square D	MS-46-N
-	Barron Bethea	FGW-1
AC-75	Continental	FSC-46N
GD-907A	Fargo	-
306092	Lapp	305740N
AC-60	Power Line Hardware	-
RALS-1	Reliable/Bethea	FS-46-N

ⁿ
July 1989

n - Bolt, double arming

Applicable Specification: ANSI C 135.1, "Standards for
Galvanized Steel Bolts and
Nuts."

Applicable Sizes : 5/8 inch diameter, 12 inch
through 24 inch length

3/4 inch diameter, 20 inch
through 24 inch length

The following manufacturers have shown compliance with the applicable
specifications for double arming bolts:

A. B. Chance Company

*Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company
Florida Wire and Cable Supply Division
Hughes Brothers

*Joslyn Manufacturing and Supply Company
Kortick Manufacturing Company
Portland Bolt & Manufacturing Company
Power Line Hardware
Steel City Bolt & Screw Co., Inc.
Utilities Service Company



*"Static proof" designs available.

o - Bolt, eye, oval

Applicable Specification: ANSI C135.4, "Standards for Galvanized ferrous Eye Bolts and Nuts for Overhead Line Construction."

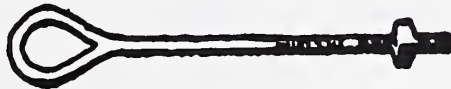
Applicable Sizes : 5/8 inch diameter, 6 inch through 20 inch length

3/4 inch diameter, 8 inch through 20 inch length

The following manufacturers have shown compliance with the applicable specifications for oval eye bolts:

Berny's Forging Company
A. B. Chance Company
*Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company
*Joslyn Manufacturing Company
Kortick Manufacturing Company
Power Line Hardware
Utilities Service Company

*"Static proof" designs available.



Shoulder Eye Bolt
for Transmission Structures

3/4 inch diameter, 8 inch through 20 inch length

	<u>Catalog Number</u>
Joslyn	J9528 to J9540
Kortick	K9558 to K2570

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July 1989

p - Connectors, Distribution (Parallel Groove)

Applicable Specification, "REA Specification for Connectors," DT-8

		ACSR to ACSR To same size or smaller Bare Conductor			
		4/0 - 2/0	1/0	2	4
Alcoa			396.6	490.0	490.0
Anderson/Sq. D	LC-53A		LC-51C	LC-51A	LC-51A
Blackburn	PAE 4141-9		PAE 2121-9	PAE 2121-9	PAE 2121-9
Burndy	KVS28A		UCG25R	UC25R2R	UC25R2R
Electrical Specialty Products, Inc.	PG-53A		PG-51C	PG-51C	PG-51C
Fargo	GA-614		GA-620	GA-620	GA-620
Penn-Union	PCAA-20BF		PCAA-15BF	PCAA-10BF	PCAA-10BF
Reliable/Bethea	APG-3		APG-2	APG-1	APG-1
		Over Armor Rods			
		3/0	2/0	1/0	2 4
Anderson/Sq. D	LC-83A		LC-52C	LC-52C	LC-52C LC-52C
Blackburn	-		-	PAA10	PAA10 PAA10
Burndy	-		-	UC32R	UC32R UC32R
Electrical Specialty Products, Inc.	-		-	PG-52C	PG-52C PG-52C
Fargo	GA-9843		GA-9842	GA-616	GA-616 GA-616
Penn-Union	-		-	ARC-12	ARC-11 ARC-14
Reliable	-		-	744AL	600AL 600AL

p - Connectors, Distribution (Parallel Groove)

Applicable Specification: "REA Specification for Connectors," DT-8

ACSR to Copper or Copperweld-Copper

ACSR Size (Bare Conductor)

	3/0	2/0	1/0	2	4
Alcoa	197	R193	R193	195	195
Anderson/Sq. D	LC-811A	LC-811A	LC-522A	LC-511A	LC-511
Blackburn	PAC7	PAC7	PAC4	2CA	4CA
Fargo	GA-616C	GA-616C	GA-620C	GA-620C	GA-620C
Reliable	600ALC	555ALC	438ALC	438ALC	438ALC

ACSR Size (Over Armor Rods)

	3/0	2/0	1/0	2	4
Alcoa	201	R197	R197	R197	199
Anderson/Sq. D	LC-833	LC-833	LC-811A	LC-811A	LC-811
Blackburn	-	-	PAC7	PAC7	PAC7
Fargo	GA-9843C	GA-9842C	GA-616C	GA-616C	GA-616C
Reliable	-	-	744ALC	600ALC	600ALC

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July 1989

p - Connector, Distribution

Applicable Specification: "REA Specification for Connectors," DT-8

Copper Type Conductors					
Connections to same size or smaller					
C'Weld Copper	2A		4A	6A	8A
Copper	0x7	2x3		4	6
Bare Conductor					
Anderson/Sq. D	DG-1/0	DG-1	DG-2	DG-4	DG-6
(s) Burndy	KS-25	KS-23	KS-23	KS-20	KS-17
(s) Dossert	DS-10-F	DS-6-F	DS-6-F	DS-3-F	DS-2-F
Fargo	GC-5020	GC-5002S	GC-5002	GC-5004	GC-5006
(s) Frankel	B-1/0	B-2	B-3	B-4	B-6
(s) Greaves	-	A-8	-	A-5	A-3
(s) ILSCO	IK-1/0	IK-2	IK-2	IK-4	IK-6
(s) Kearney	118109	118109	118108	118104	118102
(s) Krueger & Hudepohl	UC58C-EV	-	-	-	-
(s) Penn-Union	S1/0	S2	S3	S4	S6
(s) Reliable	-	1F	2F	4F	6F
Royal Switchgear	1739	1739	-	-	-
Over Armor Rods					
Anderson/Sq. D	K-5	K-4	K-4	K-2	K-2
Burndy	KVS-31	KVS-31	KVS28	KVS26	KVS26
Fargo	GC-5035	GC-5035	GC-5040	GC-5020S	GC5020
ILSCO	IKB-350	IKB-350	IKB-4/0	-	-
(s) Kearney	118112	118112	118111	118110	118110
Penn-Union	VT-4	VT-3	VT-3	VT-2	VT-1
Weaver	350CX	350CX	4/0CX	2/0CX	1/0CX

(s) designates split bolt connectors

Long Connectors (Split Bolt)			
Copper to Copper			
	2	4	6
Anderson/Sq. D	C-2-L	C-4-L	C-6-L
Burndy	KS-22-3	KS-20-3	KS-17-3
Dossert	DS5-3	DS3-3	DS2-3
Greaves	A-9	A-6	A-4
Kearney	118107	118105	118103
Penn-Union	SEL-3	SEL-4	SEL-6
Reliable	-	4F	6F

p - Connectors, Service (Parallel Groove)

Applicable Specification, "REA Specification for Connectors,"DT-8

Aluminum-to-Aluminum

Solid or Stranded

	<u>No. 2</u>	<u>No. 4</u>
Alcoa	490.0	490.0
Anderson/Sq. D	LC-51A	LC-51A
Blackburn	PAE 2121-9	PAE 2121-9
Burndy	UC25R2R	UC25R2R
Electrical Specialty Products, Inc.	PG-51C	PG-51C
Fargo	GA-620	GA-620
Penn-Union	PCAA-10BF	PCAA-10BF
Reliable/Bethea	APG-1	APG-1

Applicable Specification: "REA Specification for Connectors," DT-8

Aluminum-to-Copper

Solid or Stranded

	<u>2 Al to</u> <u>4 Cu</u>	<u>4 Al to</u> <u>6 Cu</u>
Anderson/Sq. D	LC-511A	LC-511A
Blackburn	PAC345	PAC345
Fargo	GA-620C	GA-620C

p - Connectors, Service

Applicable Specification, "REA Specification for Connectors," DT-8

Copper-to-Copper

Solid or Stranded

<u>Manufacturer</u>	<u>No. 4</u>	<u>No. 6</u>
Anderson/Sq. D	4E	6ES
Blackburn	4N	6N
Burndy	KP4C	KP6C
Dante	SE-3	SE-2
Dossert	ES-4	ES-6
Fargo	GC-5004	GC-5006
IlSCO	SX-4	SX-6
Penn-Union	SX4	SX6

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p - Connectors, Guy Bond (Parallel Groove)

Applicable Specification: "REA Specification for Connectors,"DT-8

ACSR to Guy Strand

	<u>2/0</u>	<u>1/0</u>	<u>2 & 4</u>
Alcoa	396.6	396.6	490.0
Anderson/Sq. D	LC-52A-GP	LC-51C-GP	LC-51A-GP
Blackburn	PAE 2121-9	PAE 2121-9	PAE 2121-9
Burndy	UC 28R	UCG25R	UCG25R
Dossert	AC103-LW	AC101-LW	AC100-LW
Electrical Specialty Products, Inc	PG-52A-GP	PG-51C-GP	PG-51C-GP
Fargo	GA-616	GA-620	GA-620
Penn-Union	ALC-15	ALC-10	PCA-010
Reliable	744AL	555AL	438AL

Copper to Guy Strand

Anderson/Sq. D	LC-511A
Blackburn	K-1
Burndy	UC8W26L
C & R	CRJC-1
Dossert	UDV 13-1-P
Fargo	GC-8040P
ILSCO	SK-3 (1/4")
	SK-1/0 (3/8")
Joslyn	J8300
Kearney	9968-1
Krueger & Hudepohl	UC58B-EV
Penn-Union	JC-1-AC
	(1/4", 3/8" guy strand)
	(1/0 strand copper max.)
Reliable	438ALC

p - Connectors, Compression

DISTRIBUTION

	<u>Aluminum to aluminum</u>	<u>Aluminum to copper</u>	<u>Copper to copper</u>	<u>Tap Connections (Al to Al, Al to Cu)</u>
Anderson/Sq. D	AC Series	AC Series	VCUC	VCP
Blackburn			Type CF	
Burndy	"Hycrimp" (Type YH)	"Hycrimp" (Type YH)	Crimpit" (Type YC-C)	"Cabelok Crimpit" (Type YP-U)
Electrical Specialty	"Squeeze Conn" (Type S)	Squeeze Conn" (Type S)	-	-
Homac	H Tap-OB&DB	H Tap-OB&DB	cc	H Tap-OB&DB
Kearney	"Squeezeon" (Aluminum)	"Squeezeon" "Aluminum"	"Squeezeon" (Copper)	"Squeezeon" (Aluminum)
Penn-Union	"Press-On" (Aluminum)	"Press-On" (Aluminum)	"Press-On" (Copper)	"Penn-L-Tap"

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p - Connectors, Compression

SERVICE

	<u>Aluminum-to-Aluminum</u> <u>Aluminum-to-Copper</u>	<u>Copper-to-Copper</u>
Anderson/Sq. D	VAUS	VCCS
Blackburn	CS, KL	-
Burndy	"Linkits" (Type YSU, YSD)	"Hysplice" (Types YDS-C, YDS-W)
Electrical Specialty	VSE	-
Homac	"Shure Splicers"	-
Kearney	"Serv-ens"	-
National Tel. Supply	"Nicopress"	-
Penn-Union	"Penn Sleeves"	-

These connectors are furnished in a variety of sizes to fit all combinations of aluminum and copper service wire.

p - Connectors, Transmission

BOLTED TYPE

Applicable Specification: "REA Specification for Connectors," DT-8

ACSR to ACSR
ACSR to Copper

Alcoa

580 Series

Burndy (ACSR to ACSR)

UP-A, UP-R



When ordering these clamps specify size, stranding and material of both conductors.

Compression Type

ACSR to ACSR
Same Size



<u>Conductor Size</u>	<u>Alcoa</u>	<u>Anderson</u>	<u>Burndy</u>	<u>Kearney</u>	<u>Blackburn</u>
1/0	5074.438	VPUS	YCS25R	OHR-1/0-61AJ	RCJ10
2/0	5074.484	-	YCS26R	OHR-2/0-61AJ	RCJ20
3/0	5075.547	Order	YCS27R	OHR-3/0-61AJ	RCJ30
4/0	5075.609	by	YCS28R	OHR-4/0-61AJ	RCJ40
266.8 kcmil	5076 Order by	Conductor	YCS30R	HR-266-267AJ	RCJ266M
336.4 kcmil	5076 stranding	Size	YCS33R	HR-336-267AJ	RCJ336M

ACSR to Copper

Alcoa	5070 Series
Anderson/Sq. D	VPUS
Burndy	YCR-R-CA

(Order by conductor sizes)

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July 1989

p - Connectors

(wedge type)

<u>Manufacturer</u>	<u>Aluminum-to- aluminum</u>	<u>Aluminum-to- copper</u>	<u>Copper-to- copper</u>	<u>Tap Connections (Al to Al, Al to Cu)</u>
AMP	"Ampact" (Aluminum)	"Ampact" (Aluminum)	"Ampact" (Copper)	"Ampact" (Aluminum)
Connector Products, Inc.	Aluminum Tap Connector	Aluminum Tap Connector	---	Aluminum Tap Connector
UTM	"Wrench-Lok"	"Wrench-Lok"	--	"Wrench-Lok"

p - Connectors

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Anderson/Square D</u> Compression al to al al to cu "Versa-Crimp" L tap.	748 11/1/62	To obtain experience
Parallel groove, aluminum LC-52C (1/0 - 6/1 ACSR over armor rods) LC-51C (1/0 - 6/1 ACSR)	738 6/21/62	" " "
<u>Burndy</u> Compression, insulated "Insulink"(Type ES)	672 8/6/59	" " "
<u>Blackburn</u> Compression, insulated service entrance con- nectors, Types ICS-1 and IKL	1027 10/11/73 1133 2/16/78	" " "
Bolted, insulated IPC 1102 (#2-1/0 run, #2 tap) IPC 4111 (1/0-4/0 run, #2-1/0 tap) IPC 4141 (1/0-4/0 run, 1/0-4/0 tap)	1327 9/11/86 1330 10/30/86	1. For use on 600 volt maximum insulated conductors. 2. To be used only for connecting service drop conductors to service entrance conductors. 3. To obtain experience.
<u>Homac</u> Compression, Insulated "Shure Splicers" Types Q1N and U1N	1074 9/25/75 1269 11/17/83	" " "

Conditional List
p(2)
July 1989

p - Connectors

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Kupler</u> Bolted, insulated 130001 (#2-1/0 run, #2 tap) 130003 (1/0-4/0 run, #2-1/0 tap) 130004 (1/0-4/0 run, 1/0-4/0 tap)	1306 (9/26/85)	1. For use on 600 volt maximum insulated conductors. 2. To be used only for connecting service drop conductors to service entrance conductors. 3. To obtain experience.
<u>Penn Union</u> Compression, Insulated Type PIK	866 2/8/68	To obtain experience.
<u>Raychem</u> Solder Type PowerSleeve	1378 2/9/89	To obtain experience.
<u>Utilco</u> Two bolt style, al to al Type PM	1053 11/14/74	To obtain experience.

q - bolt, double upset

Applicable Specification: "REA Specifications for Single and Double Upset Spool Bolts," D-5

Diameter, inches	5/8	5/8	5/8	5/8
Length, inches	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
Chance	-	7826	7828	7830
Cooper Power Systems* (Mcgraw-Edison)		DC3E11	DC3E12	DC3E13
Dixie	D7824	D7826	D7828	D7830
Joslyn	-	J2394	J2395	J2396
Kortick	K4760	K4761	K4762	K4763
Utilities Service	31065	31067	31069	31071



*Static proof" designs available.

^s
July 1989

s - Clevis, secondary swinging

Applicable Specifications: REA Specifications for Secondary Swinging
Clevises, D-6

<u>Manufacturer</u>	<u>Clevis only*</u>	<u>Clevis with 1-3/4" groove spool</u>	<u>Clevis with 3" groove spool</u>
Chance	0352	0352-C909-1032	0352-C909-1034
Cooper (McGraw- Edison)	DC4S1	DC4S14	DC4S13
Dixie	D0352	-	-
Joslyn	J0322	J0392	J0393
Kortick	K9259	K9109	K9149
Utilities Service	32043	36043	32143

*Catalog Number does not include spool. See page cm for spool type insulators.

u - Deadend for galvanized steel or
alumoweld guy strand



3-Bolt Guy Clamp

	Light (1/2" bolts)	Heavy 5/8" bolts)*
Chance	6450	6461
Cooper Power Systems (McGraw-Edison)	DG3C2	DG3C3
Dixie	D6450	D6461
Joslyn	J930	J931
Kortick	K4124	K4005
Util. Service	5273	5275



U-Bolt Guy Clamp

	Light (3/8" bolts)	Heavy (1/2" bolts)
Barron Bethea	GCU-38C	-
Continental	GC-64C	GC-67C
Flagg (MIF)	PAX-64C	PAX-67C

Offset Guy Clamp

	Light (1/2" bolts)	Heavy (5/8" bolts)
Chance	6409	6410
Joslyn	J926	J927

*For use on transmission.

u - Deadend for galvanized steel guy strand

Strand Size:	1/4"	9/32"	5/16"	3/8"	7/16"
<u>Fargo</u> Bail for thimble eye	GDE-300	GDE-301	GDE-301	GDE-302	GDE-303
<u>Reliable</u> Bail for thimble eye Bail for guy insulator	5100 5150	5201 5251	5201 5251	5102 5152	5103 5153
					
	<u>Formed Type</u>				
<u>Chance</u> For standard guy* For wrapped guy	1/4 CTLG 1/4 GSC-C	9/32 CTLG 9/32 CTLG-C	5/16 CTLG 5/16 GSC-C	3/8 CTLG 3/8 GSC-C	7/16 CTLG 7/16 GSC-C
<u>Dulmison</u> For standard guy*	SGG-0610	SGG-710	SGG-0790	SGG-0915	SGG-1105
<u>Florida Wire & Cable</u> For standard guy*	FLA 1300	FLA 1400	FLA 1500	FLA 1600	FLA 1700
<u>Helical Line Products</u> For standard guy*	HG-207-1/4"	HG-208-9/32"	HG-209-5/16"	HG-210-3/8"	HG-211-7/16"
<u>Preformed Line Products</u> For standard guy* For wrapped guy	GDE-1104 WGL-2100	GDE-1105 WGL-2101	GDE-1106 WGL-2102	GDE-1107 WGL-2103	GDE-1108 WGL-2104

*Class B galvanizing. When guy wire has Class C galvanizing, formed deadend should also have Class C galvanizing.

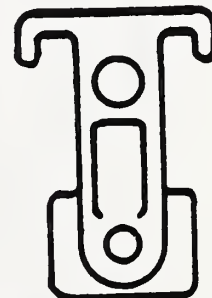


u – Deadend for aluminoweld guy strand									
Strand Size	3#10(4M)	7#12(6M)	7#11(8M)	7#10(10M)	7X.110"(11.5M)	7#9(12.5M)	7X.121"(14M)	7#8(16M)	7X.148"(20M)
Chance For standard guy	<u>Formed Type</u>								
	<u>Aluminoweld Guy Strand</u>								
Helical Line Products For standard guy		6M-AWTLG	8M-AWTLG	10M-AWTLG		12.5M-AWTLG			
		HG517-6M	HG519-8M	HG521-10M		HG523-12.5M	HG524-14M	HG525-16M	HG528-20M
Preformed Line Products For standard guy for wrapped guy	AWDE-4108	AWDE-4110 WGL-4110	AWDE-4113 WGL-4113	AWDE-4116 WGL-4116	AWDE-4118	AWDE-4119 WGL-4120	AWDE-4120	AWDE-4122	AWDE-4126
	<u>Automatic</u>								
Fargo Reliable	<u>Aluminoweld Guy Strand</u>								
		GDE-300 5200	GDE-301 5201	GDE-301 5201		GDE-302 5202			

v-1
July 1989

v - Guy Attachment
for 5/8" bolt

<u>Type:</u>	<u>Formed Strap</u>	<u>Angle Bolt Eye</u>	<u>Guy Hook</u>	<u>Guy Hook</u>
<u>Maximum Working Load Rating</u>	23,130 N (5200 lbs.)	23,130 N (5200 lbs.)	23,130 N (5200 lbs.)	37,800 N (8500 lbs.)
Anderson Elec./ Square D	-	-	-	-
Barron Bethea	-	-	-	GH-5
Chance	5004	0100	C203	C203-0168
Continental Electric	-	-	GAD	GAD-56-4
Cooper Power Systems	DG6H1	DG11E1	DG21H1 DG21H2	-
Dixie	D5004	D0100	DD-9460	DD-9462
Flagg (MIF)	-	-	P151A,	P151X
Joslyn	J25164	J6500	J6555, J6556	-
Kortick	K4035, K4047	K3140	-	-
Power Line Hardware	-	-	-	HGA-58C
Reliable/Bethea	-	-	-	AG-5
Universal Electric	-	-	-	UGA-56C
Util. Service	31030	5531	-	-



*This hook may be used in place of the wrapped guy arrangement in assemblies E3-2 and E3-3.

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July 1989

Pole Eye Plates
(5/8" Bolt)

<u>Type</u>	<u>Pole Eye Plate</u>
<u>Maximum Working Load Rating</u>	<u>37,800 N. (8500 lbs.)</u>
Anderson Elec./ Square D	GSP-05
Continental Electric	PEP-66-45
Flagg (MIF)	PX88
Power Line Hardware	PGA-548
Reliable/Bethea	PE5-6A

Conditional List

v
July 1989

v - Guy attachment

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Joslyn Pole Band, with cone head bolt, J-6281 and guy clip J-6275 J-6280 (for 6" to 10" pole) J-6270 (for 8" to 14" pole)	745 8/16/62	To obtain experience. For distribution lines only and 10,000 lbs maximum loading.

W
July 1989

w - Insulators, guy strain
(Fiber Reinforced Plastic)

Ult. Strength, pounds	11,000	15,000	21,000
<u>Barron Bethea</u>	BB-11-CC Series	BB-15-CC Series	BB-21-CC Series
<u>Continental</u>	G-11 Series	G-15 Series	G-21 Series
<u>Cooper</u> (McGraw- Edison)	-	DEG 15 Series	DEG 30 Series
<u>Flagg (MIF)</u>	150 Series	150 Series	210 Series
<u>Hughes Brothers</u>	-	992 Series	994 Series
<u>Reliable/Bethea</u>	FGS16 Series	FGS16 Series	FGS21 Series
<u>Tranpol</u>	HSI1-1P Series	HSI-2X Series	HSI3-1P Series

^x
July 1989

x - Rod, anchor

Applicable Specification: ANSI C135.2, "Standards for
Galvanized Ferrous Strand
Eye Anchor Rods."

Applicable Sizes: Single guy - 5/8 inch diam. 6, 7 and 8 feet long
- 3/4 inch diam. 8, 9 and 10 feet long
- 1 inch diam. 9 and 10 feet long

Double guy - 5/8 inch diam. 7 and 8 feet long
- 3/4 inch diam. 8, 9 and 10 feet long
- 1 inch diam. 9 and 10 feet long

Single Guy Drive - 5/8 inch diam. 7 and 8 feet long
- 3/4 inch diam. 8, 9 and 10 feet long
- 1 inch diam. 9 and 10 feet long

Double Guy Drive - 5/8 inch diam. 7 and 8 feet long
- 3/4 inch diam. 8, 9 and 10 feet long
- 1 inch diam. 9 and 10 feet long

The following manufacturers have shown compliance with the applicable specifications. Some manufacturers cannot supply all sizes listed above. Check with manufacturer or distributor for availability.

Carolina Galvanizing
Chance
Cooper Power Systems
Dixie
Grip-Tite

Joslyn
Knight
Kortick
Utilities Service



y - Galvanized Steel Strand

Applicable Specification: ASTM A475 (Class A, B or C Coating)

DISTRIBUTION GUY STRAND

Grade Size	<u>Siemens Martin</u>		<u>High Strength (HS)</u>		<u>Extra High Strength (EHS)</u>		
	1/4"	3/8"	7/16"	1/4"	9/32"	5/16"	3/8"
Manufacturer							
Alcan Cable	X	X	X	X	X	X	X
Armco							
Steel Corp.							
Bekeart Steel	X	X	X	X	X	X	X
Wire Corp.							
Bethlehem							
Steel	X	X	X	X	X	X	X
CF & I	X	X	X	X	X	X	X
Cal-Wire	X	X	X	X	X	X	X
Davis Walker	X	X	X	X	X	X	X
Florida Wire							
and Cable	X	X	X	X	X	X	X
Indiana Steel							
and Wire	X	X	X	X	X	X	X
National Strand							
Products	X	X	X	X	X	X	X
Paulsen Wire							
Rope Corp.	X	X	X	X	X	X	X
Seal Wire Co.	X	X	X	X	X	X	X
Southwire	X	X	X	X	X	X	X
Texstrand							

Note: The buyer should specify Class A, B or C coating per ASTM Specification A475.

y - Galvanized Steel Strand

Applicable Specification: ASTM A475 (Class A, B or C Coating)

TRANSMISSION GUY STRAND

Grade Size	High Strength (HS)				Extra High Strength (EHS)					
	1/4"	9/32"	5/16"	3/8"	7/16"	1/4"	9/32"	5/16"	3/8"	7/16"
Manufacturer										
Alcan Cable	X			X	X				X	X
Armco Steel Corp.	X		X	X	X			X	X	X
Bekeart Steel Wire Corp.	X		X	X	X			X	X	X
Bethlehem Steel	X			X	X			X	X	X
CF & I	X		X	X	X			X	X	X
Cal-Wire	X	X	X	X	X		X	X	X	X
Davis Walker	X	X	X	X	X		X	X	X	X
Florida Wire and Cable	X	X	X	X	X		X	X	X	X
Indiana Steel and Wire	X	X	X	X	X		X	X	X	X
National Strand Products	X	X	X	X	X		X	X	X	X
Paulsen Wire Rope Corp.	X			X	X				X	X
Seal Wire Co.	X			X	X				X	X
Southwire	X	X	X	X	X		X	X	X	X

Note: The buyer should specify Class A, B or C coating per ASTM Specification A475.

y - Galvanized Steel Strand

Applicable Specification: ASTM A363 (Class A, B or C Coating)

Grade Size	<u>OVERHEAD STATIC WIRE</u>			
	High Strength (HS) 3/8"	High Strength (HS) 7/16"	Extra High Strength (EHS) 5/16"	Extra High Strength (EHS) 3/8"
<u>Manufacturer</u>				
Alcan Cable	X	X		X
Armco Steel Corp.	X	X	X	X
Bekeart Steel Wire Corp.	X	X	X	X
Bethlehem Steel	X	X	X	X
CF & I	X	X	X	X
Cal-Wire	X	X	X	X
Davis-Walker	X	X	X	X
Florida Wire and Cable	X	X	X	X
Indiana Steel and Wire	X	X	X	X
National Strand Products	X	X	X	X
Paulsen Wire Rope Corp.	X	X	X	X
Seal Wire Co.	X	X	X	X
Southwire	X	X	X	X

Note: The buyer should specify Class A, B or C coating per ASTM Specification A363.

Conditional List

y
July 1989

y - Al-Zn Alloy Coated Steel Wire
Applicable Specification: ASTM A785 (Classes 30 & 45)
Condition of Acceptance - To obtain experience

Distribution Guy Strand

Grade	Siemens Martin	High Strength					Extra High Strength				
Size	1/4" 3/8" 7/16"	1/4" 9/32" 5/16" 3/8" 7/16"					1/4" 9/32" 5/16" 3/8" 7/16"				

Bethlehem Steel	X	X	X		X		X	X	X		X	X
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Transmission Guy Strand

Grade	High Strength					Extra High Strength				
Size	1/4" 9/32" 5/16" 3/8" 7/16"					1/4" 9/32" 5/16" 3/8" 7/16"				

Bethlehem Steel		X			X	X		X		X	X	X
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(Purchaser should specify class 30 or class 45)

y - Aluminum Coated Steel Wire
Applicable Specification ASTM A474

National Strand Products, 3/8"

Distribution Guy Strand

Siemens-Martin	1362	To obtain experience.
High-Strength	5/12/88	
Extra High Strength		

Transmission Guy Strand

High-Strength	1362	To obtain experience.
Extra High Strength	5/12/88	

Overhead Static Wire

High-Strength	1362	1. To obtain experience.
Extra High-Strength	5/12/88	2. Must meet the joint requirements of ASTM A363.

z - Anchors, Expanding and Plate

DISTRIBUTION

Designated Maximum holding power-lbs.		6000	8000	10,000	12,000
Min. Area - sq. in.		90	100	120	135
Rod Dia. - inches		5/8	5/8	3/4	3/4
Rod Length - feet		7	7	8	-
	<u>Type</u>				
Chance	8 way	88135	88135	88135	88135
Cooper (McGraw- Edison)	4 way	DA1E5	DA1E6	DA1E6	DA1E7
Dixie	4 way Plate	D88100-G -	D88115-G D7502-G	D88135-G -	D88135-G D7504-G
Everstick	3 way 4 way	834 -	836 -	8310 84-3/4	- -
Grip-Tite	8 way	A322086G	A322088G	A322812G	A322812G
Joslyn	8 way Plate	J8100-G -	J8115-G J7502-G	J8135-G J7503-G	J8135-G J7504-G
Power Line Hardware	8 way	8-100G	8-115G	8-135G	8-135G
South Central	8 way	-	84115AG	84135AG	84135AG
Utilities Service	8 way Plate	C88100-G -	C88115-G C617-G	C88135-G C622-G	C88135-G C822-G

NOTE: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

z-2
July 1989

z - Anchors, plate

Applicable Specification: "REA Specification for Steel Plate Anchors," T-3

TRANSMISSION

Minimum Area 400 sq. in.

Chance

X24 - 3/4

Cooper Power Systems
(McGraw-Edison)

DA4P7 - 3/4 - G

Grip-Tite

XP24 - 3/4 - G

Joslyn

J3524 - 3/4 - G

Power Line Hardware

CP-24G

NOTE:

Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

z - Anchors, Service

Designated Maximum Holding Power in Sand - 2500 lbs.

	<u>Screw</u>	<u>Expanding</u>
Chance	6346	6870
Cooper Power Systems (McGraw-Edison)	DA2N1	-
Dixie	D-6526	-
Grip-Tite	-	322065G
Joslyn	J6526W-CA	J0870-G
Power Line Hardware	-	8-70G
Utilities Service	C6346-G	PL62-2.5-G

z - Anchors, Swamp

DISTRIBUTION

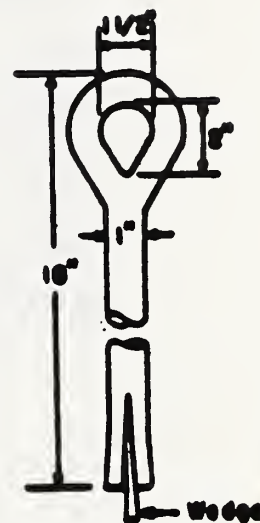
	<u>10" dia.</u>	<u>12" dia.</u>	<u>15" dia.</u>
Chance	10150AS	132AS	152AS
Dixie	D-6710-S	D-6713-S	D-6715-S
Joslyn	J2871SG	J2872SG	J2873SG
Utilities Service	C10150A-G	C122A-G	C152A-G

NOTE: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

z-4
July 1989

z - Anchors, Rock

	Expanding Rock Anchors			Rock Guy Bolt
Anchor Size - inches	1-3/4	1-3/4	1-3/4	1-3/4
Rod Length - inches	15	30	53	18
Rod Diameter - inches	3/4	3/4	3/4	1
Chance	R315	R330	R353	-
Joslyn	J3436	J3437	J3438	-
Kortick	K5503	K5504	K5505	K2377
Utilities Service	CR315	CR330	CR353	5003



z - Pole keys

Chance	P-4817
Joslyn	J-4817
Utilities Service	CP-4817

z - Anchors, Power-installed screw

Manufacturer:

A. B. Chance Company
"SS" Multi Helix Anchors

Working Load Categories

Soil Type	35,600 N (8,000 lb.)	53,400 N (12,000 lb.)	71,000 N (16,000 lb.)	89,000 N (20,000 lb.)
A1	12642-AE	12642-AE	12642-AEJ	12642-AEJ
Soil	12642-AEJ	12642-AEJ	12642-EJN	12642-EJN
Class 2	12642-EJN	12642-EJN	12642-EJNS	12642-EJNS
A2	12642-AE	12642-AE	12642-AEJ	12642-EJN
Soil	12642-AEJ	12642-AEJ	12642-EJN	12642-EJNS
Class 3	12642-EJN	12642-EJN	12642-EJNS	
B	12642-AE	12642-AEJ	12642-AEJ	12642-EJNS
Soil	12642-AEJ	12642-EJN	12642-EJN	
Classes 4 & 5	12642-EJN		12642EJNS	
C	12642-AEJ	12642-EJN	12642-EJNS	
Soil	12642-EJN			
Classes 6 & 7				

Manufacturer:

Joslyn
"PS" Screw Anchors

Working Load Categories

Soil Type	35,600 N (8,000 lb.)	53,400 N (12,000 lb.)	71,000 N (16,000 lb.)	89,000 N (20,000 lb.)
A1	J24991ACA	J24991ACA	J25534ACAB	J25534ACAB
Soil	J23381ACA	J23381ACA	J25535ACAB	J25535ACAB
Class 2	J23383ACA	J23383ACA	J25533ACAB	J25533ACAB
A2	J24991ACA	J24991ACA	J23381ACA	J23383ACA
Soil	J23381ACA	J23381ACA	J23383ACA	J23384ACA
Class 3	J23383ACA	J23383ACA	J23384ACA	
B	J24991ACA	J23381ACA	J23381ACA	J23384ACA
Soil	J23381ACA	J23383ACA	J23383ACA	
Classes 4 & 5	J23383ACA		J23384ACA	
C	J23381ACA	J23383ACA	J23384ACA	
Soil	J23383ACA			
Classes 6 & 7				

NOTES: 1. See REA Specification T-10 for definitions and explanations.

2. Anchors in the 53,400 N (12,000 lb.) category or above for use on wood poles must be used with hardware commensurate with the working load. Hardware may provide for either single or multiple guy attachments to the anchor.
3. Anchors listed in a specific working load category and/or soil class may generally be used at lower working load categories and/or lower numerical soil classes.

z - Anchors, Power-installed screw

Manufacturer: Dixie Electrical Manufacturing Company
Multi-Helix Screw Anchors

Working Load Categories				
Soil Type	35,600 N (8,000 lb.)	53,400 N (12,000 lb.)	71,000 N (16,000 lb.)	89,000 N (20,000 lb.)
A1	D-6632	D-6632	D-6636	D-6636
Soil Class 2	D-6636	D-6636	D-6637	D-6637
A2	D-6637	D-6637	D-6638	D-6638
Soil Class 3	D-6632	D-6632	D-6636	D-6637
B	D-6636	D-6636	D-6637	D-6638
Soil Classes 4 & 5	D-6637	D-6637	D-6638	
C	D-6632	D-6636	D-6636	D-6638
Soil Classes 6 & 7	D-6636	D-6637	D-6637	
	D-6637		D-6638	

- NOTES: 1. See REA Specification T-10 for definitions and explanations.
2. Anchors in the 53,400 N (12,000 lb.) category or above for use on wood poles must be used with hardware commensurate with the working load. Hardware may provide for either single or multiple guy attachments to the anchor.
3. Anchors listed in a specific working load category and/or soil class may generally be used at lower working load categories and/or lower numerical soil classes.

July 1989

z - Anchors




<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Screw anchors, power installed	1252 2/3/83	To obtain experience.
24462 (6,000 and 8,000 lb.)		
12332P 5/8" rod		
12587 5/8" thimbleye		
24484 (10,000 and 12,000 lb. anchor helix)		
12632P (3/4" rod)		
6512 (thimbleye nut)		
<u>Cooper Power Systems (Mcgraw-Edison)</u>		
Screw anchors, power-	992	To obtain experience.
installed	5/25/72	
DA11G621 (6,000 & 8,000		
lb., 5/8" rod		
<u>Dixie</u>		
Screw anchors, power-	859	To obtain experience.
installed	2/9/67	
D-1162-G (6,000 &		
8,000 lb., 5/8" rod)		
D-1375-G (10,000 &		
12,000 lb., 3/4" rod)		
<u>Joslyn</u>		
Screw anchors, power-	973	To obtain experience.
installed	8/19/71	
J11B-CA (6,000 & 8,000		
lb., 5/8" rod)		
J13C-CA (10,000 & 12,000		
lb., 3/4" rod)		
<u>Foresight</u>		
MR-1	1360 3/31/88	1. To obtain experience. 2. Each installation must be proof tested. Maximum rating is test value achieved.

NOTES: Where galvanized anchors are listed, the same anchors ungalvanized (black asphalt coated) are also acceptable.

Catalog numbers shown are for anchors with 1-3/8" hubs. Equivalent anchors with 1-1/2" hubs are also acceptable. (A special installing wrench is required.)

aa, ab
July 1989

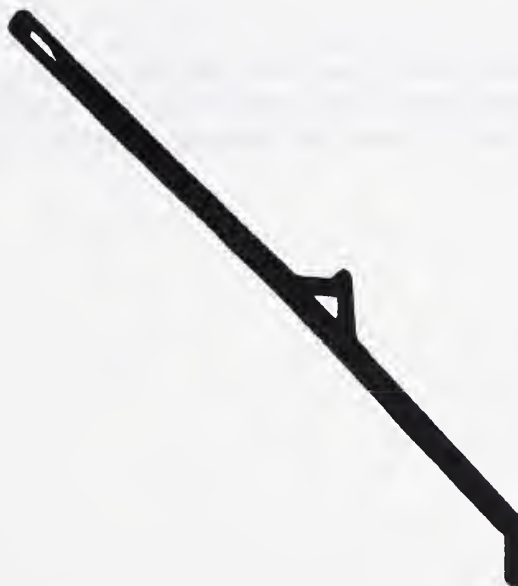
aa - Nut, eye
ab - Nut, thimble eye
5/8 inch

	<u>Eye Nut Conventional</u>	<u>Eye Nut Eyelet</u>	<u>Thimble Eye Nut</u>
			
American Connector Engineering	EN-5		
Barron Bethea	OEN-2A	B-14A	EN4A
Berny's Forging Co.	OE1	-	-
Chance	6502	-	6510
Continental Electric	EN-5	BE-5	TN-5
Cooper Power Systems (McGraw-Edison)	DG2E3	DG6E1	DG1E1
Dixie	D6502	DD-6517	D6510
Flagg (MIF)	P125C	P127A	P128A
Hughes	EN60	-	-
Joslyn	J1092	J1126	J6510
Kortick	K4212	K4413	K3111
Power Line Hardware	OEN-58	BEL-58	-
Reliable/Bethea	E-5	B-5	NT-5
Utilities Service	450	497	C580

ac
July 1989

ac - Brace, sidearm diagonal

	<u>1-1/2 inch angle</u> <u>3/16" x 5'</u>	<u>1-3/4 inch angle</u> <u>3/16" x 7' .</u>
Chance	-	6984
Cooper Power Systems (McGraw-Edison)	DB1A1	DB1A5
Joslyn	J1521	J1525
Kortick	K1951	K1954
Utilities Service	5210	5212



ae-1
July 1989

ae - Surge Arrester, Distribution
(Lightning Arresters)

<u>Manufacturer</u>	<u>Type</u>	<u>Ratings, kV</u>	<u>Duty</u>
Cooper Power Systems (McGraw-Edison)	TS	9/10, 18	Normal
	TL	9, 10, 18	Heavy
General Electric	Alugard	9, 10, 18	Heavy
Joslyn	Q	9/10, 18	Normal
	J	9/10, 18	Heavy
Kearney	Unigap	9, 10, 18	Heavy
Westinghouse	LV	9/10	Normal
	LVBB	9/10, 18	Heavy

NOTE: Either arresters with external top gaps and without ground lead disconnectors or direct connected arresters with ground lead disconnectors may be used as specified by the user.

ae - Surge Arresters, Substation*
(Lightning Arresters)

<u>Manufacturer</u>	<u>Type</u>	<u>Accepted Ratings - kV</u>	<u>Manufacturer's Classification</u>
Cooper (McGraw- Edison)	ES	3, 9/10, 18	Distribution
General Electric	Alugard	3, 9, 10, 18	Distribution
Joslyn	Q	3, 9/10, 18	Distribution
Kearney	Unigap	3, 9, 10, 18	Distribution
Westinghouse	LV	3-20	Distribution
	IVL	3-120	Intermediate
	CPL	3-312	Station

- * For instructions concerning application at substations, refer to REA Bulletin 65-1, "Guide for the Design of Substations for Electric Borrowers." In the purchase of arresters, care should be taken to select the type and voltage ratings in accordance with the line voltage and the type of construction (grounded or ungrounded).

Conditional List

ae(1)

July 1989

ae - Surge Arresters, Distribution
Metal Oxide

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Cooper Power Systems (McGraw-Edison)</u>		
Surge arresters, distribution, metal oxide type, AZL 9, 10, 18 kV	1287 9/27/84	To obtain experience
<u>Joslyn</u>		
Surge arresters, distribution metal oxide type, ZQ 9, 10, 18 kV	1317 3/27/86	To obtain experience
<u>Ohio Brass</u>		
Surge arresters, distribution metal oxide type Dynavar, 9, 10, 18 kV	1283 7/12/84	To obtain experience
Porcelain, DV	1334	
Polymer, PDV-65	1/15/87	
PDV-100	1386 6/29/89	
<u>Westinghouse</u>		
Surge arresters, distribution metal oxide type HMX HEAVY DUTY: 9, 10, 18 kV	1320 5/8/86	To obtain experience

NOTE: Either arresters with external top gaps and without ground lead
disconnectors or direct connected arresters with ground lead
disconnectors may be used as specified by the user.

ae - Surge Arrester, Substation*

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Cooper Power Systems (McGraw-Edison)</u>		
Surge arrester, station class, metal oxide type, VariSTAR 3 kV thru 312 kV Type ATZ1A	1223 11/19/81	To obtain experience
Surge arrester, inter- mediate class, metal oxide type, VARISTAR 9 kV thru 120 kV, Type AZF	1287 9/27/84	To obtain experience
<u>General Electric</u>		
Surge arrester, station class, metal oxide type, Tranquell, 2.7 kV thru 588 kV	1164 5/24/79	To obtain experience
Surge arrester, intermediate class, metal oxide type, Tranquell, 3 kV thru 120 kV	1197 10/9/80	To obtain experience
<u>Joslyn</u>		
Surge Arrester, intermediate class, metal oxide type, Type ZI 3 thru 144 kV	1268 10/27/83	To obtain experience
Surge arrester, station class, metal oxide type, Type ZS, 3 kV thru 240 kV	1278 4/12/84	To obtain experience
Surge arrester, station Class, metal oxide type, Type ZSH, 258 thru 468 kV	1341 5/14/87	To obtain experience
<u>Ohio Brass</u>		
Surge arrester, station class, metal oxide type Dynavar, 3 kV thru 357 kV	1175 11/2/79 1239 7/29/82	To obtain experience
Surge arrester, intermediate class, metal oxide type, Dynavar, 3 kV thru 120 kV	1242 9/9/82	To obtain experience
<u>Westinghouse</u>		
Surge arrester, station class, metal oxide type, SMX-30, 3 thru 240 kV	1256 4/6/83	To obtain experience

*For instructions concerning application at substations refer to REA Bulletin 65-1, "Guide for the Design of Substations for Electric Borrowers." In the purchase of arresters, care should be taken to select the type and voltage rating in accordance with the line voltage and the type of construction (grounded or ungrounded).

af-1
July 1989

af - Cutouts, Distribution, Open

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Rating</u>
Chance	C	15, 27 kV
Cooper Power Systems (McGraw-Edison)	S1	15, 27 kV
General Electric	9F34D	15, 27 kV
Joslyn	L, 100 amp J, 200 amp	15, 27 kV
Kearney	KX	15, 27 kV
S & C Electric	XS	15, 27 kV
Southern States	Series 66 Series 70	15, 27 kV 15 kV
Westinghouse	NCX LBU-11	15, 27 kV 15, 27 kV

NOTE: The buyer should specify the load rating, voltage rating, interrupting rating and required accessories.

Cutout used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

af - Cutout, open-link fuse support

<u>Manufacturer</u>	<u>Mounting</u>	<u>12.5/7.2 kV 50 amp.</u>	<u>24.9/14.4 kV 50 amp.</u>
Cooper (McGraw- Edison)	Crossarm Bushing	FT1A2 FT10A3	FT1A4 -
Joslyn	Crossarm	J9254-6	J9264-6
Kearney	Crossarm Bushing	6484-55 6483-59	- -

NOTE: Items listed on this page are fuse supports only and have no inherent interrupting capacity. They should be used with fuse links capable of interrupting at least 1200 amperes and for transformer protection only.

af-3
July 1989

af - Power Fuses, Substation

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Rating</u>
Kearney	HX	15
	HX	27
S & C Electric	XS	15-25
	SMD (Boric Acid)	15-138
Southern States	Series P	15-161
Westinghouse	RDB (Boric acid, refillable)	15-34.5
	DBS (Boric acid, non-refillable)	15-34.5
	DBA (Boric acid, refillable)	46-69

NOTE: All fuses listed on this page should be furnished with NEMA standard insulators. The buyer should specify the current rating, voltage rating, interrupting rating and required accessories.

af - Cutouts, Distribution, Open
with Linkbreak Attachment

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Rating</u>	<u>Meeting No. and date</u>	<u>Conditions</u>
A.B. Chance	C	15, 27 kV	1311 (12/19/85)	1. To obtain experience. 2. Limited to 100 amp cutouts. 3. To be used only with Chance, Cooper (McGraw-Edison) and Kearney fuses. Will not break S&C and some other fuse types.

Conditional List

ag
July 1989

ag - Fuses, Current Limiting, Backup

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
15 kV Class		
Type K-Mate 25	1084	1. To obtain experience
Catalog No. C70L-31KA	2/19/76	
25 kV Class		
Type K-Mate 25	1196	2. Must be used in series
Catalog No. C70L-32KA	9/18/80	with external expulsion fuse 25 K or 15 T or smaller or with CSP transformers 50 kVA or smaller.
<u>Cooper Power Systems (McGraw-Edison)</u>		
15 kV Class		
No. FAH6H45	1094	Same as above
25 kV Class	7/29/76	
No. FAH7H45		
<u>General Electric</u>		
15 kV Class	1369	Same as above.
9F59U Series	9/8/88	
25 kV Class		
9F59U		
<u>High-Tech Fuses</u>	1290	
15 kV Class	11/29/84	
No. HTDE23 (X)025		Same as above
25 kV Class		
No. HTDE24 (X)025		
35 kV Class		
No. HTDE25 (X)025		
<u>RTE</u>		
15 kV Class		
Catalog No. 3553025M11	1140	Same as above
25 kV Class	6/1/78	
Catalog No. 3554025M11		
<u>Westinghouse</u>		
15 kV Class		
Type CLTX, 25K/15T	1105	Same as above
25 kV Class	1/6/77	
Type CLTX, 25K/15T		

ah
July 1989

ah - Tie, insulator, formed type

Manufacturer

Type

Chance

Tygard Type AWTY-56* (Side tie for use over armor rod on spool insulator with 1-3/4" groove)

Super Top-Tie, Type STT for single or double support use, with insulators 2-1/4" through 3-1/2" neck diameter and single support use on spool insulators with 1-3/4" groove diameter (Order for specific conductor size.)

Preformed Line Products

WT "Wraplock"
(Order for specific conductor size and insulator)

ST "Groove-Formed"
side tie (Order for specific conductor size and insulator)

Spool Tie for ACSR, Type SPL* (Side tie for use on spool insulator with 1-3/4" groove)

DST double support top tie
(Order for specific conductor size and insulator)

DBST double side tie
(Order for specific conductor size and insulator)

*Not for side mounting on pin or post insulators.

ai-1
July 1989

ai - Rods, Ground

Applicable Size: The standard length is 8 feet and catalog numbers listed below are for this length. Longer rods may be required for special conditions.

Copper-covered ground rods are listed with a 13 mil minimum at any point and a 15 mil average covering of copper. All purchases should specify that a factory certification of the thickness of the copper must accompany the shipment of the rods.

Copper-covered steel rods

	<u>5/8"</u>
Apache	GR588
Blackburn	6258
Boggs	EB810
Calpico	CP588
Carolina Galvanizing	P-588
Erico	E858
Joslyn	J8338
Knight	858
Korns	KCG58
Kortick	K5428
Power Line Hardware	GR-588C
Utilities Service	6617
Wilcor	WA588C

Stainless Clad Steel

<u>Manufacturer</u>	<u>5/8"</u>	<u>3/4"</u>
Teledyne (MEFCO)	"PERMAGROUND"	"PERMAGROUND"

ai - Rods, Ground

Applicable Size: The standard length is 8 feet and catalog numbers listed below are for this length. Longer rods may be required for special conditions.

Hot Dip Galvanized Steel

<u>Manufacturer</u>	<u>5/8"</u>	<u>3/4"</u>
Blackburn	GR6258	GR7508
Boggs	G588	G348
	PTG588**	PTG348**
Carolina Galvanizing	G588	G348
	G-588PT**	G-348PT**
Chance	8578	8618
	C203-0107**	C203-0109**
	C203-0377*	
Cooper Power Systems (McGraw-Edison)	DN5S8	DN6S8
	DN6D8*	
Dixie	D8578	D8618
Erico	G588	G348
	G588PT**	G348PT**
Galvan	GR6258	GR7508
General Electric	0982-00002	0982-00003
Grip-Tite	GT588	GT348
	GT588PT**	GT348PT**
Joslyn	J3358B*	J3458B*
	J5328	J5338
	J5228**	J5238**
Knight	G-588	G-348
	G-588PT**	G348PT**
Korns	KG58	KG34
Kortick	K4658	K4678
Lloyd	6258H	7508H
National Utility Products	UR1016-8	UR1216-8
Porcelain Products	7338	7348
Power Line Hardware	GR-588G	GR-348G
Utilities Service	5307	6338
Wilcor	WA8580G	WA8340G

Electro-Galvanized Steel

Apache	G588**	G348*
	G588PT**	G348PT**
Calpico	G8580	-
LMP	6258E**	7508E**

Stainless Steel

Teledyne (MEFCO)	TDY Sol	TDY Sol
Wilcor	WA 588-S	WA348-S

*Rod furnished with clamp.

**Rod furnished with 4 ft., No. 6 tinned or galvanized copper pigtail.

ai-3
July 1989

ai - Rods, ground, sectional

Galvanized steel and
copper-covered steel

Copper-covered ground rods are listed with a 13 mil minimum at any point and a 15 mil average covering of copper. All purchases should specify that a factory certification of the thickness of the copper must accompany the shipment of the rods.

Sectional Ground Rods

<u>Manufacturer</u>	<u>8' long</u>	<u>10' long</u>	<u>Coupling</u>	<u>Driving studs</u>
Blackburn	6258S	6260S	60C	60DS
Carolina Galv.	S-588 GSD-588 GSD-348	S-5810 GSD-5810 GSD-3410	CR58 CG250 CG250	DSH58 DSH58 DSH58
Chance Galv. Steel	C203-0052	8512	8611	-
Cooper Power Systems Galv. Steel	(McGraw-Edsion) DN17S8	DN16S10	DN1K2	-
Demark	-	-	GRC 58G	-
Erico	ES858	ES1058	CR58	DSH58
Joslyn Galv. Steel	J9158 J23282.8	J9160 J23282.10	J9182 J23282A	J9186 J9186
Knight	S858 GSD858 GSD834	S1058 GSD1058 GSD1034	SC58 KG250 KG260	DS58 DS58 DS34
Kortick	K5441	K5443	K5482	K5492
Power Line Hardware	GR-588CS	GR-5810CS	CBC-58	DS-58
UTM	-	-	910-030-05	-

aj - Clamp, Ground Rod

<u>Manufacturer</u>	<u>For 5/8"</u> <u>Copper-</u> <u>Covered Rod</u>	<u>For 3/4" Galv.</u> <u>or Stainless</u> <u>Steel Rod</u>	<u>For 5/8" Galv.</u> <u>or Stainless</u> <u>Steel Rod</u>
AMP	Copper AMPACT (Order by Description)	-	-
Anderson	GC-5	-	-
Blackburn	G5	-	-
Boggs	G31	-	-
Burndy	GRC58	-	-
C & R Products	CRGC-58	-	-
Carolina Galv.	CPH58	-	CPH58
Connector Castings	G5	-	-
Dossert	GNL62H	-	-
*Erico (Cadweld)			
1 ground wire	GR1-161G	GR1-181G	GR1-161G
2 ground wires	GT1-161G	GT1-181G	GT1-161G
Greaves/Mercury	G-580	-	-
Ilsco	GRC-58	-	-
Joslyn	J8392AB	J25985	J25932
Knight	C58	UCSS	UCSS
Kortick	K4647	-	-
Lew Electric Fittings	GRC-5/8"	-	-
O-Z Elec. Mfg.	BGO304	-	-
Penn-Union	CEB-2	-	-
Power Line Hardware	RC-58CE	-	-
Reliable	E58	3459	3459
UTM	910-023-03	910-007-02	910-007-02
Wilcor	HGR5/8	WAU-3/4"	WAU-5/8"

*Includes disposable molds.

Conditional List

aj
July 1989

aj - Clamp, ground rod

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Burndy</u> YGHP (for 5/8" copper- covered rods)	1234 5/13/82	To obtain experience.
<u>Power Line Hardware</u> RC-34 (for 5/8" and 3/4") galvanized or stainless steel ground rods	1114 5/12/77	To obtain experience.

al
July 1989

al - Staples, ground wire

Applicable Specification: ANSI C135.14, "Standards for
Staples with Rolled or Slash
Points."

Length x Spread (inches)	1-1/2 x 1/4	2 x 1/2	1-1/2 x 3/8	3 x 1-1/16
Diameter	9 gauge <u>Galv. Steel</u>	8 gauge <u>Galv. Steel</u>	8 gauge <u>Copper-Coated</u>	1/4 <u>Moulding</u>
Apollo	AP521-S1672G	AP521-S1570	AP501-S6652	AP500-S6497
Blackburn	-	-	CUS9	CUS22
Chance	C205-0247	C205-0216	9167	9161
Copperweld Southern		-	CP52	-
FWC	FW1672G	FW157	FW6652	FW6497
Joslyn	J1672G	J157	J6652	J6497
Kortick	-	-	K247	K236
Larson	-	350453	750233	721312
Utilities Service	88	86	48	46

Barbed staples, ground wire

Length x Spread (inches)	1-1/2 x 3/8	2 x 5/8	1-1/2 x 3/8	3 x 1-1/16
Diameter	.131 <u>Galv. Steel</u>	.165 <u>Galv. Steel</u>	.140 <u>Copper-Coated</u>	7/32 <u>Galv. Steel</u>
Apollo		AP520-57488HTG	AP501-S66525	
Joslyn	J7656	J7672	J7682	J7664

Staples, alumoweld

Length x Spread (inches)	2 x 1/2	1-1/2 x 3/8	3 x 1-1/16
Diameter	8 gauge <u>8 gauge</u>	8 gauge <u>8 gauge</u>	1/4 moulding <u>1/4 moulding</u>
Apollo	AP531-S6655AL	AP531-S6652AL	AP530-S7493AL
Joslyn	-	J6652AL	J-7493AL

Clip, ground wire

Kearney

12326

Conditional List
al
July 1989

al - Staples, Ground Wire

Clip, Ground Wire

Manufacturer

Meeting No.
and Date

Conditions

Fastex (ITW)
No. 780-2

1038
4/4/74

To obtain experience.

an - Transformers, distribution, pole type
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

Applicable Specifications: REA Specifications for Rural Distribution
Transformers, D-10

Listing is by type rather than by catalog number because of the many
possible combinations of voltage, kVA and taps and protective equipment.

	<u>7.2/12.5 & 7.62/13.2</u>	<u>14.4/24.9</u>	<u>Dual Voltage</u>
<u>Arkansas Electric Cooperative</u>			
Conventional, single bushing	ASE		
<u>Central Moloney</u>			
Conventional, single bushing	AOD	AOD	AOD
Conventional, two bushing	AOD	AOD	AOD
Self-protected, single bushing	DVP	DVP	DVP
The single bushing transformer may also be obtained with bushing mounted cutout and lightning arrester, and with internal fuse and double gap.			
<u>Cooper Power Systems (RTE)</u>			
Conventional, single bushing	REA-Conv	REA-Conv	REA-Conv
Self-protected, single bushing	REA-CSP	REA-CSP	REA-CSP
Conventional, two bushing	REA-Conv	REA-Conv	REA-Conv
Conventional single bushing type may also be purchased with external overload protection and double gap and with bushing mounted cutout and lightning arrester.			
<u>Dowzer</u>			
Conventional, single bushing	CR	CR	CR
Self-protected, single bushing	CSP-R	CSP-R	CSP-R
Conventional, two bushing	CD	CD	CD

an-1.2
July 1989

an - Transformers, distribution, pole type
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

	<u>7.2/12.5 & 7.62/13.2</u>	<u>14.4/24.9</u>	<u>Dual Voltage</u>
<u>ERMCO</u>			
Conventional, single bushing	CONV	CONV	CONV
Conventional, two bushing	CONV	CONV	CONV
Self-protected, single bushing	CSP	CSP	CSP

The single bushing transformer may also be obtained with double gap and internal fuse (Type DG) or lightning arrester and external cutout (Type COLA).

Dead-front for use in enclosure: Add "R" (Radial) or "LF" (Loop feed) to designation.

General Electric

Conventional, single bushing	HS	HS	HS
Self-protected, single bushing	HSBA	HSBA	HSBA
Conventional, two bushing	HS	HS	HS

Type HS may also be obtained with internal fuse, with internal fuse and double gap, with bushing mounted cutout and double gap, and with bushing mounted cutout arrester (Type HSCA).

Howard Industries

Conventional, single bushing	REC-C	REC-C	REC-C
Conventional, two bushing	Conv-2B	Conv-2B	Conv-2B
Self-protected, single bushing	REC-P	REC-P	REC-P

Kuhlman

Conventional, single bushing	I	I	I
Conventional, two bushing	B	B	B
Self-protected, single bushing	H	H	H

Type I may also be purchased with internal fuse, with internal fuse and double gap (Type G), and with bushing mounted cutout and lightning arrester (Type J).

an - Transformers, distribution, pole type
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

	<u>7.2/12.5 & 7.62/13.2</u>	<u>14.4/24.9</u>	<u>Dual Voltage</u>
<u>Magnetic Electric</u>			
Conventional, single bushing	AOD	AOD	AOD
Conventional, two bushing	AOD	AOD	AOD
Self-protected, single bushing	AOD	AOD	AOD
<u>NECO/Hammond</u>			
Conventional, single bushing	NC	NCH	
Self-protected, single bushing	NC-1	NCHCB	

Type NC may also be obtained with
double gap and internal fuse (NC-2)
and with arrester and open link fuse
(NC-3).

<u>Rural Electric Supply Cooperative</u>	
Conventional, single bushing	CONV
Conventional, two bushing	CONV
Self-protected, single bushing	CSP

The single bushing transformer
may also be obtained with double
gap and internal fuse (Type DG) or
lightning arrester and external
cutout (Type COLA).

Dead-front for use in enclosure:
Add "R" (Radial) or "LF" (Loop
Feed) to designation.

<u>Sesco</u>	
Conventional, single bushing	RU
Self-protected, single bushing	ESP
Conventional, two bushing	CONV

Type RU may also be purchased
with internal fuse and/or
lightning arrester.

an-1.4
July 1989

an - Transformers, distribution, pole type
Primary Voltages 7.2/12.5, 7.62/13.2 and 14.4/24.9 kV

	<u>7.2/12.5 & 7.62/13.2</u>	<u>14.4/24.9</u>	<u>Dual Voltage</u>
<u>United (Ky. AEC)</u>			
Conventional, single bushing	SC	SC	DSC
Conventional, two bushing	SC	SC	DSC
Self-protected, single bushing	SCP	SCP	DSCP

SC and DSC may be purchased with
external fuse and arrester (SP and DSP)

<u>VanTran</u>	
Conventional, single bushing	CR
Self-protected, single bushing	CSP-R
Conventional, two bushing	CD

<u>Westinghouse</u>			
Conventional, single bushing	S-B3	S-B3	S-B3
Self-protected, single bushing	CSP-B3	CSP-B3	CSP-B3
Conventional, two bushing	S-A	S-A	S-A

Type S-B3 may also be obtained
with internal fuse, with internal
fuse and double gap, and with
lightning arrester and open link
cutout (Type PC).

Applicable Specification: REA Specification for Step-Down Substation Transformers, S-3

Transformers with 115 kV and 138 kV primary voltage ratings are acceptable with full BIL and with one step reduced BIL.

"X" indicates that acceptable test data have been furnished REA for this rating and for secondary voltages in either 15 kV or 25 kV class.

All acceptances are based on standard impedances, taps, winding designs, materials and accessories. Variations should not be ordered except under special circumstances. Complete design tests should be specified for special designs.

[illegible]

an - Transformers, Power
Three-Phase, Step-Down
For Distribution Substation Use

Primary Voltage-kV	KVA					MVA									
	750	1000	1500	2000	2500	3750	5	7.5	10	12	15	20	25	30	
ABB															
34.4							X	X	X	X	X				
43.8									X						
67.0					X	X	X	X	X	X	X	X	X	X	
115							X	X	X	X	X	X	X	X	
138							X	X	X	X			X	X	

Transformers 5 MVA also accepted as load tap changing transformers using ASEA Electric Type UZD load tap changers.

Cooper Power Systems (McGraw-Edison)

34.4	X						X	X	X	X				
43.8	X				X		X	X	X	X				
67.0	X			X	X		X	X	X	X			X	
115											X			
138											X			

Transformers 5 MVA and larger also accepted as load tap changing transformers using McGraw-Edison Types 550, 550B, and 550C load tap changers.

General Electric

34.4	X						X	X	X	X	X	X		
43.8	X				X		X	X	X	X	X	X		
67.0	X			X	X		X	X	X	X	X	X	X	X
115							X	X	X	X	X	X	X	X
138							X	X	X	X	X	X	X	X

Transformers 5 MVA and larger also accepted as load tap changing transformers using General Electric Types LR72, LR65 and LRT-200 load tap changers.

an - Transformers, Power
Three-Phase, Step-Down
For Distribution Substation Use

Primary Voltage-kV	750	1000	1500	2000	2500	3750	5	7.5	10	12	15	20	25	30
<u>Hevi-Duty</u>														
34.4		X	X		X	X	X	X	X	X	X	X		
43.8					X	X	X	X	X	X	X	X	X	
67.0		X	X		X	X	X	X	X	X	X	X		
115					X	X	X	X	X	X	X	X		
138						X	X	X	X	X	X	X	X	

Transformers 5 MVA and larger also accepted as load tap changing transformers using Westinghouse
Types UTS-A and UTT-B and Siemens Allis Type TLS load tap changers.

<u>Kuhlman</u>														
34.4					X	X	X	X	X	X	X	X	X	
43.8					X	X	X	X	X	X	X	X		
67.0					X	X	X	X	X	X	X	X		
115					X	X	X	X	X	X	X	X		
138					X	X	X	X	X	X	X	X		X

Transformers 5 MVA and larger also accepted as load tap changing transformers using Siemens-Allis
Types TLS and ILH-21 load tap changers.

<u>North American Transformer</u>														
67.0							X			X	X	X	X	
115										X	X	X	X	X
138										X	X	X	X	X

Transformers 5 MVA and larger also accepted as load tap changing transformers using North American
type IC-525 load tap changers.

<u>Westinghouse</u>														
34.4		X	X	X	X	X	X	X	X	X	X	X	X	
43.8		X	X	X	X	X	X	X	X	X	X	X	X	
67.0		X	X	X	X	X	X	X	X	X	X	X	X	
115							X	X	X	X	X	X	X	
138										X	X	X	X	

Transformers 5 MVA and larger also accepted as load tap changing transformers using Westinghouse
Types UTS-A, UTT-B and UVW load tap changers.

an - Transformers, Distribution, Pole Type

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Ermco</u> 7.2/12.5 and 7.62/13.2 and 14.4/24.9 kV Single-phase, single bushing with internal Tranquell Under-oil Arrester	1359 3/17/88 1362 5/12/88	To obtain Experience.
<u>General Electric</u> 7.2/12.5, 7.62/13.2, 14.4/24.9 kV and Dual Voltage		
Single-phase, single bushing, and two bushing with internal Tranquell Under-oil Arrester	1316 3/6/86	To obtain experience.
Single-phase, single bushing and two bushing, 25 and 50 kVA pole type distribution transformers with amorphous metal cores	1320 5/8/86	To obtain experience.
Single-phase, single bushing and two bushing pole type distribution transformers with G.E. high voltage switch	1370 9/22/88	To obtain experience.
<u>Kuhlman</u> 7.2/12.5 kV and 7.62/13.2 kV Toroform design 10, 15, & 25 kVA	1370 9/22/88	To obtain experience.
<u>Cooper Power Systems (RTE)</u> 7.2/12.5, 7.62/13.2, 14.4/24.9 kV and Dual Voltage		
Single-phase, single bushing, self-protected, with Magnex Interrupter	1358 3/3/88	To obtain experience.

Conditional List
an(1.2)
July 1989

an - Transformers, Distribution, Pole Type

<u>Manfuacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>VanTran</u> 14.4/24.9 kV and Dual Voltage	1075 10/16/75	To obtain experience.
Conventional, single bushing Type CR		
Conventional, two bushing Type CD	1095 8/11/76	
Self-protected, single bushing Type CSP-R		
<u>Westinghouse</u> 7.2/12.5, 7.62/13.2	1333 12/18/86	To obtain experience.
Single-phase, single bushing, 25 and 50 kVA pole type distribution transformers with amorphous metal cores.		
14.4/24.9 kV & Dual Voltage	1354 12/31/87	To obtain experience.
Single-phase, single bushing, 25 kVA pole type distribution transformers with amorphous metal cores.		

an - Transformers, Power
Single-Phase, Step-Down
For Distribution Substation Use

Condition of Acceptance: To obtain experience.

Transformers with 115 kV and 138 kV primary voltage ratings are acceptable with full BIL and with one step reduced BIL.

"X" indicates that acceptable test data have been furnished REA for this rating and for secondary voltages in either 15 kV or 25 kV class.

"S" indicates that performance specifications have been furnished REA and test data are to be submitted when available.

Primary Voltage-kV	kVA Capacity												
	167	250	333	500	833	1250	1667	2500	3333	5000	6667	8333	10,000
ABB													
67.0								S					
Cooper Power Systems (McGraw-Edison)													
34.4				S			S		S		S	S	S
43.8	S	S	S					S	S		S	S	S
67.0	S	S						S	S		S	S	S
ESCO													
34.4	X			X	X								
General Electric													
43.8										S		S	S
115												S	
Hevi-Duty													
34.4										S	S	S	S
43.8										S	S	S	S
67.0										S	S	S	S
115										S	S	S	S
H. K. Porter (Delta-Star)													
34.4	S	S	S	S	X	X	S						
43.8					S	S	S	X					
67.0					S	X	S	X	X	S	S	S	S
115							S	S	S	S	S	S	S

an - Transformers, Power Single-Phase, Step-Down for Distribution Substation Use

Condition of Acceptance: To obtain experience.

Westinghouse
34.4
43.8
67.0

an - Transformers, Power
Three-Phase, Step-Down
for Distribution Substation Use

Condition of Acceptance: To obtain experience.

Primary Voltage-kV	KVA					MVA									
	750	1000	1500	2000	2500	3750	5	7.5	10	12	15	20	25	30	

ABB

115
138

S

Transformers 5 MVA and larger also accepted as load tap changing transformers using ASEA Electric Type UZD load tap changers.

Cooper Power Systems (McGraw-Edison)

34.4
43.8
67.0

S
S
S

S S S S S S S S S S S S S S S

Transformers 5 MVA and larger also accepted as load tap changing transformers using McGraw-Edison Types 550, 550B and 550C load tap changers.

Ferranti-Packard

34.4
43.8
115
138

S S S X S S

General Electric

34.4
43.8
115
138

S S S S S S S S S S S S S S S

Transformers 5 MVA and larger also accepted as load tap changing transformers using General Electric Types LR72, LR65 and LRT-200 load tap changers.

Hevi-Duty

34.4
43.8
67.0
115
138

S S S S S S

S S S S S S S S S S S S S S S

Transformers 5 MVA and larger also accepted as load tap changing transformers using Westinghouse Types UTS-A and UTT-B and Siemens Allis Type ILS load tap changers.

an - Transformers, Power
Three-Phase, Step-Down
for Distribution Substation Use
Condition of Acceptance: To obtain experience.

Primary Voltage-kV	750	1000	1500	2000	2500	3750	5	7.5	10	12	15	20	25	30
KVA														
MVA														
<u>Copper Power Systems</u>														
(McGraw-Edison)														
34.4	S		S	S						S		S	S	
43.8	S		S								S	S	S	S
67.0	S		S								S	S	S	S
<u>H. K. Porter (Delta Star)</u>														
34.4	S	S			S	X	X	X	S					
43.8		S	S		S	X	X	X	S	X				
67.0	S	X		S	X	X	X	X	X	X	X			
115						X	X	X	S	X	X			
138						S	S	S	S	S	S	S	S	X

Transformers 5 MVA and larger also accepted as load tap changing transformers using Seimens-Allis
Types TLS and TLH-21 load tap changers.

MGM

34.4
43.8
67.0

S
X
S

S
S
S

Transformers 5 MVA and larger also accepted as load tap changing transformers using Westinghouse
Types UTS-A and UTT-B load tap changers.

Uptegraff

34.4
43.8

S
S

S
X

Westinghouse

34.4
43.8
67.0
115
138

S
S

S
S

Transformers 5 MVA and larger also accepted as load tap changing transformers using Westinghouse
Types UTS-A, UTT-B and UVW load tap changers.

an - Transformers, Step Ratio, Single Phase,
Autotransformers or Two-Winding Transformers
for Use in System Voltage Conversion

Condition of Acceptance: To obtain experience.

<u>Manufacturer</u>	<u>Designation</u>	<u>Size</u>
<u>Central Moloney</u> 2-WND	AOD	167-500
<u>Cooper Power Systems</u> (McGraw-Edison)		
2-WND	"Round-Coil"	167-500
AUTO	MEPS-AUTO	167-1000
<u>General Electric</u>		
2-WND	HS STEP	167-500
AUTO	HS STEP	167-1000
<u>Howard Industries</u>		
2-WND	STEPS	167-500
<u>H. K. Porter (Delta Star)</u>		
2-WND	LTD	167-500
AUTO	LTD-A	167-1000
<u>Westinghouse</u>		
2-WND	"Jumbo"	167-500

NOTE: Two-winding transformers are self-protected under external short circuit in accordance with ANSI C57.12.90A. Auto-transformers will withstand 25 times rated current under external short circuit in accordance with ANSI C57.12.90A.

ao
July 1989

ao - Bolt, strand eye, straight (thimble eye)

Applicable Specification: ANSI C135.4, "Standards for
Galvanized Ferrous Eye Bolts
and Nuts for Overhead Line
Construction."

Applicable Sizes : 5/8 inch, 6 through 12 inch length
3/4 inch, 8 through 12 inch length

The following manufacturers have shown compliance with the applicable
specification:

A. B. Chance Company
*Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company
Joslyn Mfg. and Supply Company
Kortick Manufacturing Company
Utilities Service Company



*"Static proof" designs available.

ap - Clamp, hot line
Copper and Copperweld-copper Conductor
(Clamps with internal springs and enclosed threads)

Conductor Size

Copper	6 thru	2/0
Copperweld-copper	8A thru	2A

Anderson	BH-00
Blackburn	HLC 2108
Chance	S1520CC
Electrical Specialty	BC-2/0
Fargo	GH-100*
Ideal	3532
Penn-Union	HLC-020-LS

* For use with CL Fuse, order GH-201

ap-2
July 1989

ap - Clamp, hot line
ACSR with armor rods

Clamps listed below have spring action and enclosed thread chambers.

Conductor Size		4/0 & 3/0	2/0	1/0 & 2	4
	<u>Tap Conductor</u>				
Anderson	Aluminum	AH-7	AH-4	AH-4	AH-4
	Copper	AH-7-GP	AH-4-GP	AH-4-GP	AH-4-GP
Chance	Aluminum	S1540-AA	S1540-AA	S1530-AA	S1530-AA
	Copper	S1540-AC	S1540-AC	S1530-AC	S1530-AC
Electrical Specialty	Aluminum	-	AHC-500	AHC-500	AHC-500
	Copper	-	AHC-500-GP	AHC-500-GP	AHC-500-GP
Fargo	Aluminum	GH-102A	GH-102A	GH-101A	GH-101A
	Copper	GH-102AC	GH-102AC	GH-101AC	GH-101AC
Penn Union	Aluminum	-	-	HLCA-040	HLCA-040
	Copper			HLCA-040	HLCA-040
Utilco	Aluminum	-	HLC-397	-	HLC-40

ar
July 1989

ar - Wireholder

Applicable Specification: "REA Specification for Service Wireholders," D-15

	<u>With #22 Wood Screw</u>	<u>With 3/8" x 5" Bolt</u>
Blackburn	SW3	-
Chance	3-11-44	-
Cooper Power Systems (McGraw-Edison)	DWIR1	-
Dixie	D3-11-44	-
Joslyn	J089	-
Porcelain Products	1986	-



NOTE: For Triplex type service cable see clevis type wireholders on page "bt."

as
July 1989

as - Clevis, service swinging

Applicable Specifications: "REA Specifications for Service Swinging
Clevises," D-7

	<u>Clevis Only*</u>	<u>Clevis with Wet Process Spool</u>	<u>Clevis with Dry Process Spool</u>
Chance	1948C	1948C-C909-1031	1948C-0606
Cooper Power Systems (McGraw-Edison)	DC7S2	-	-
Dixie	D1938	D1938-C	D1948-C
Joslyn	J1614	-	J1615
Kortick	K9260	K9141	K9142
Utilities Service	32003	31003	31004

*Catalog number does not include spool; for spool insulators see Item cm.

at-1
July 1989

at - Guy Marker, 8 Foot Length

Steel

<u>Manufacturer</u>	<u>Full Round</u>	<u>Half Round</u>
Cooper Power Systems (McGraw-Edison)	DG15G1	DG5G3
Joslyn	J1618	J1528
Kortick	K3729	-

at-2
July 1989

at - Guy Marker
8 Foot Length
Plastic or Fiberglass

<u>Manufacturer</u>	<u>Catalog Number</u>
Auburn Extrusions	TK-808 (Yellow) (with bolt type clamp)
Chance	96-PBG-2 (Gray) 96-PBG-2Y (Yellow) 96-PBG-2ORG (Orange)
Chance*	96-FRPMR-GRY (Gray) 96-FRPMR-YEL (Yellow) 96-FRPMR-ORG (Orange) 96-FRPMR-GRN (Green)
Electrical Materials*	70-7G (Gray) 70-7Y (Yellow) 70-7O (Orange)
Joslyn	J1491Y (Yellow) J1491G (Gray)
Joslyn*	J26260.8 (Yellow) J26261.8 (Gray)
Preformed Line Products*	PG-5508 (Gray) PG-5518 (Yellow)
Radar Engineers*	6032 (Yellow)
Tranpol*	HGG-OL8Y-C (Yellow)
Vaughn*	003-7140 (Gray) 004-7140 (Yellow) 005-7140 (White)
Virginia Plastics*	TG-125-8G (Gray) TG-125-8Y (Yellow)
Virginia Plastics**	FG-8G (Gray) FG-8Y (Yellow)

* For use with formed or automatic type deadends for guy strand; will not fit over bolt type guy clamps.

** Available with either 1 or 2 bolt clamps.

at - Reflective Guy Marker, 8-foot length

Plastic or Fiberglass

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
*Nordic HG-815 yellow	1061 3/20/75	To obtain experience.

*For use with formed or automatic type deadends for guy strand; will not fit over bolt type guy clamps.

Applicable Specification: ASTM Specification B 232

Preferred Sizes: (Larger sizes may be used where the engineer's study shows they are required.)	<u>Distribution</u>	<u>Transmission</u>
	4 - 6/1	1/0 - 6/1
	4 - 7/1	2/0 - 6/1
	2 - 6/1	3/0 - 6/1
	2 - 7/1	4/0 - 6/1
	1/0 - 6/1	266.8 kcmil - 26/7
	2/0 - 6/1	336.4 kcmil - 26/7
	3/0 - 6/1	477 kcmil - 26/7
	4/0 - 6/1	556.5 kcmil - 26/7
	266.8 kcmil 18/1	795 kcmil - 26/7
	336.4 kcmil 18/1	954 kcmil - 54/7
	477 kcmil 18/1	

The following manufacturers have shown compliance with the applicable specifications:

Alcan Cable

ALCOA-ACPC

Cablec

Kaiser

Nehring

Noranda

Pirelli Cable

Reynolds

Southwire

NOTES

1. Conductors with 18/1 stranding have different sag characteristics than conductors with 6/1 or 26/7 stranding. This difference in sag characteristics must be taken into consideration in the line design.

2. 266.8 kcmil 26/7, 336.4 kcmil 26/7, and 477 kcmil 26/7 may be used for distribution underbuild on transmission lines.

av - Conductor, copper

Applicable Specifications: ASTM Specification B1-81 (or latest revision) for hard-drawn solid
ASTM Specification B8-81 (or latest revision) for hard drawn stranded and soft stranded
ASTM specification B3-74(80) (or latest revision) for soft or annealed solid.

Preferred Sizes:	Hard-drawn solid	4 and 6
	Soft or annealed solid	4 and 6
	Hard-drawn stranded	2x3, 1/0 x 7, 2/0 x 7
	Soft stranded	4 and 6

The following manufacturers have shown compliance with the applicable specifications:

Alcan Cable

Allied Tube & Conduit

Cablec

Essex

General Cable

Nehring

Phelps Dodge

Rome Cable

Service Wire Company

Southwire

av-3
July 1989

av - Conductor, Copperweld-copper

Applicable Specification: ASTM Specification B 229

Preferred Sizes:	<u>Distribution</u>	<u>Transmission</u>
	8A	1/0 F
	6A	2/0 F
	4A	3/0 F
	2A	4/0 F

The following manufacturers have shown compliance with the applicable specification for the sizes indicated:

Copperweld Southern	(All sizes)
Southwire	(2A and smaller)

av - Conductor, Service
(Single Conductor)

<u>Manufacturer</u>	<u>Aluminum</u>	<u>Copper</u>
Alcan Cable	x	x
Conductor Products	x	
Essex	x	x
Kaiser	x	
Phelps Dodge	x	
Pirelli Cable	x	x
Reynolds	x	
Rome Cable	x	x
Southwire	x	x
Cablec	x	x

Applicable Specification: IPCEA-NEMA Standard S-66-524

Insulation: Cross-linked thermosetting polyethylene or equal,
meeting requirements of Sections 7.3.3 and 7.3.5.

Conductor: Physically and electrically equal to MHD copper or
HD (EC-H19) aluminum, meeting requirements of Section 7.3.2.
(Compact or compressed stranded conductor is acceptable.)

Marking: Manufacturer's name and type of insulation shall be clearly
shown in durable markings on the surface of the insulation
at intervals no greater than 24 inches.

av-5
July 1989

av - Conductor, Service Cable
(Triplex and Quadruplex)

<u>Manufacturer</u>	<u>Aluminum</u>	<u>Copper</u>
Alcan Cable	x	x
Cablec	x	x
Conductor Products	x	
Essex	x	x
Hendrix	x	x
Kaiser	x	
Phillips Cables, Inc. (Marked "Phillips W")	x	
Pirelli Cable	x	x
Reynolds	x	
Rome Cable	x	x
Southwire	x	x

Applicable Specifications: REA Specification D-2, Specifications for
600 Volt Neutral-Supported Secondary Service
Drop Cables.

av - Conductor, Aluminum Alloy

Applicable Specification: ASTM Specification B399

Preferred Sizes:

<u>DISTRIBUTION</u>		<u>TRANSMISSION</u>	
<u>6201</u>	<u>ACSR Equiv.</u>	<u>6201</u>	<u>ACSR Equiv.</u>
48,690 cmil - 7 str.*	4	123,300 cmil - 7 str.**	1/0
77,470 cmil - 7 str.*	2	155,400 cmil - 7 str.**	2/0
123,300 cmil - 7 str.	1/0	195,700 cmil - 7 str.**	3/0
155,400 cmil - 7 str.	2/0	246,900 cmil - 7 str.	4/0
195,700 cmil - 7 str.	3/0	312,800 cmil - 19 str.	266,800 cmil
246,900 cmil - 7 str.	4/0	394,500 cmil - 19 str.	336,400 cmil
		559,500 cmil - 19 str.	477,000 cmil
		652,400 cmil - 19 str.	556,500 cmil
		927,200 cmil - 37 str.	795,000 cmil

*Not recommended for multiphase lines with span lengths exceeding 300 ft.

**Not recommended for suspension type construction.

The following manufacturers have shown compliance with the applicable specifications:

<u>Manufacturer</u>	<u>Type</u>
Alcan	6201
ALCOA-ACPC	6201
Kaiser	6201
Reynolds	6201
Southwire	6201

Conditional List
av
July 1989

av - conductor

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Copperweld Southern</u>		
Alumoweld-aluminum	863 (4/13/67)	To obtain experience.
6/1 ACSR/AW, #2, #1/0,	984 (2/3/72)	To obtain experience
#2/0, #4/0	1376 (1/12/89)	To obtain experience.
4/3 AWAC, #4, #2, #1/0		
<u>Reynolds Metals</u>		
5005 Aluminum Alloy #4-7	803 (10/22/64)	Where suspension insu-
strand through 4/0-7 strand;		lator type of con-
281,460 cmil-19 strand		struction is employed
(266,800-18/1 ACSR equiv.)		on transmission lines,
through 312,760 cmil-19 strand		the minimum size of
(266,800-26/7 ACSR equiv.)		this conductor to be
		used is 4/0.
<u>Southwire</u>		
5005 Aluminum Alloy #4-7	999 (8/31/72)	Where suspension insu-
strand through 4/0-7 strand;		lator type of con-
557,500 cmil-19 strand		struction is employed
(477,000-26/7 ACSR equiv.)		on transmission lines,
		the minimum size of
		this conductor to be
		used is 4/0.
<u>Alcoa</u>		
795 kcmil 26/7 ACSR/AW	1247 (11/18/82)	To obtain experience.

aw
July 1989

aw - Washer, Spring

1/4 x 1-3/4' x 3-1/2"

<u>Manufacturer</u>	<u>Bolt Size</u>		
	5/8"	3/4"	7/8"
Chance	3540	3541	--
Cooper Power Systems (McGraw-Edison)	DF17W3	DF17W4	DF17W5
Joslyn	J3540	J3541	J3542
Kortick	K2909	--	--
Fastex (ITW) "Ramp Lok"	1-760-21	1-760-31	1-760-41
Power Line Hardware	SCW-58	SCW-34	SCW-78

ax - Cutout and Arrester, Combination

Nominal System Voltage Cutout Max. Voltage Rating	For 12.5Y/7.2 kV		For 13.2Y/7.6 kV		For 24.9Y/14.4 kV	
	7.8 kV	15 kV	15 kV	15 kV	18 kV	27 kV
Application		30 Bank 30 Sect.	30 Bank 30 Sect.	30 Bank 30 Sect.	10 Trans. 50"	30 Bank 30 Sect. 10 Sect. 100
Cutout Current Rating Type	10 Trans. 50"	10 Sect. 100	10 Trans. 50"	10 Trans. 50"	10 Trans. 50"	10 Trans. 50"
Manufacturer	Catalog Numbers					
Chance	Crossarm Transformer	C71A-112PL Series	C71A-112PB Series	C71A-112PB Series	C71C-211PB Series	
Cooper (McGraw-Edison)	Crossarm (L) Transformer	AFS301B Series	AFS301C Series	AFS301C Series	AFS800M018 Series	AFS301D Series
General Electric	Crossarm (L) Transformer	9F80	9F80	9F80	9F78A	9F80
Joslyn (valve) (valve)	Crossarm (valve) Transformer	J9237-Q6 J9237-Q2/B	J9237-Q2/R J9237-Q2/B/R	J9237-Q2/R J9237-Q2/B/R	J9267-Q6 J9268-1Q	J9267-Q2 J9267-Q2/B
Kearney	Crossarm Transformer	294072	KE3AB110E-110	KE4AB110E-110	294074	KE7BD109E-110

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

*These cutouts have open links and must not be used where fault currents are high or for sectionalizing.

(L) Indicates loadbreak type is available.

ax - Cutout and Arrester, Combination

Nominal System Voltage Cutout Max. Voltage Rating	For 12.5/7.2 kV Wye 7.8 kV	For 13.2/7.6 kV Wye 15 kV	For 24.9/14.4 kV Wye 18 kV 27 kV
Application Cutout Current Rating	For 10 Transformers & 10 Sectionalizing 50*	For 30 Banks & 30 Sect. 100	For 10 Trans. For 30 Banks & 10 Sect. & 30 Sect. 50* 100
Manufacturer Type Mounting	Catalog Numbers		
Westinghouse Crossarm Electric Corporation Crossarm (L) LBU-II/	7.8 NCX/ 9 LVG 7.8 LBU-II/ 9 LVG	15 NCX/10 LVG 15 LBU-II/10 LVG	24.9 NCX/ 18 LVG 24.9 18 LVG

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

*These cutouts have open links and must not be used where fault currents are high or for sectionalizing.

(L) Indicates loadbreak type is available.

ay
July 1989

ay - Cutout and gap, combination

<u>Manufacturer</u>	<u>Type of Mounting</u>	<u>12.5/7.2 kV 50 amp*</u>	<u>24.9/14.4 kV 50 amp*</u>
Cooper Power Systems Transformer (RTE)		32-2674A03	32-2674A06

*These combinations contain the open-link type of cutout.

az
July 1989

az - Pole Numbers and Letters, Metal

(See Drawing M52-3)

Manufacturer

Almetek Industries, Inc.

Premax Products

Catalog No.

"E-Z Tags"
Order by description

1523

ba
July 1989

ba - Bolt, Angle Eye

Thimble Type

Applicable Specification: ANSI C135.4, "Standards for Galvanized Ferrous Eye Bolts and Nuts for Overhead Line Construction."

Applicable Sizes : 5/8 inch, 6 through 12 inch length
3/4 inch, 8 through 12 inch length

The following manufacturers have shown compliance with the applicable specifications:

A. B. Chance Company
*Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company
Joslyn Mfg. and Supply Company
Kortick Manufacturing Company
Utilities Service Company



*"Static proof" designs available.

bb
July 1989

bb - Brace, sidearm vertical

	26" brace <u>24" bolt-hole spacing</u>	50" brace <u>24" bolt-hole spacing</u>
Cooper Power Systems (McGraw-Edison)	DB1V1	DB1V3
Dixie	D6986	D6987
Joslyn	J1536	J1537
Kortick	K1931	K1932
Utilities Service	5249	5250

be - Recloser, oil circuit
12.5/7.2 kV

Cooper (McGraw-
Edison) Single phase - Type H, ratings 5-50 amperes, maximum
interrupting capacity 1250 amperes.
Single phase - Type 4H, ratings 5-100 amperes, maximum
interrupting capacity 2500 amperes.
Single Phase - Type L, ratings 25-100 amperes, maximum
interrupting capacity 2500 amperes.
Three phase - Type 6H, ratings 5-100 amperes, maximum
interrupting capacity 2500 amperes.
*Three phase - Type RX, ratings 25-400 amperes, maximum
interrupting capacity 6000 amperes.
*Three phase - Type W, ratings 100-560 amperes,
maximum interrupting capacity 10,000 amperes.
*#Three phase - Type RXE, rating 400 amperes, maximum
interrupting capacity 6000 amperes.
*#Three phase - WE, rating 560 amperes, maximum
interrupting capacity 10,000 amperes.
*#Three phase - ME, ratings 560 or 1120 amperes,
maximum interrupting capacity 16,000 amperes.

Lexington
Switch and
Controls Single phase - A Line, Model B, ratings 5-50 amperes,
maximum interrupting capacity 1250 amperes.
Single phase - A Line, Model D, ratings 25-100 amperes,
maximum interrupting capacity 2000 amperes.
Single phase - A Line, Model K, ratings 25-100 amperes,
maximum interrupting capacity 4000 amperes.

24.9/14.4 kV

Cooper (McGraw-
Edison) Single phase - Type E, rating 5-100 amperes, maximum
interrupting capacity 2500 amperes. Available with
shunt lockout solenoid for three-phase operation.
*#Three phase - Type RVE, rating 400 amperes, maximum
interrupting capacity 6000 amperes.
*Three phase - Type WV, ratings 560 amperes, maximum
interrupting capacity 8000 amperes.
*#Three phase - type WVE, rating 560 amperes, maximum
interrupting capacity 8000 amperes.
*Single phase - Type 4E, rating 50-280 amperes, maximum
interrupting capacity 4000 amperes.
*#Three phase - Type CXE, rating 560 amperes, maximum
interrupting capacity 16,000 amperes, maximum voltage 34.5 kV

* Ratings greater than 100 amp. for 12.5/7.2 kV application, and greater than
200 amp. for 24.9/14.4 kV application, are acceptable only with ground trip
device.

Not acceptable with load current, bushing Ct battery chargers.

be - Reclosers, Vacuum interrupter
12.5/7.2 kV

Cooper Power Systems (McGraw-Edison) *#Three phase - Type VSA, ratings
100 - 560 amperes

* Ratings greater than 100 amp. for 12.5/7.2 application, and greater than 200 amp. for 24.9/14.4 kV application, are acceptable only with ground trip devices.

#Not acceptable with load current, bushing CT battery chargers.

Conditional List
be(1)
July 1989

be - Recloser, oil circuit
12.5/7.2 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>*Lexington Switch and Controls</u>		To obtain operating experience.
Three phase oil circuit recloser, 50, 100 and 280 ampere frames,	808 (1/7/65)	
A Line, Model 3B (5-5- Amperes)	1087 (4/1/76)	
Model 3D (5-100 Amperes)	1329 (10/9/86)	
Model 3K (25-28 Amperes)		

<u>*Westinghouse</u>		To obtain operating experience.
Three phase oil circuit recloser (Shunt trip with static or relay type controls)		
Type ES-400 (15-400 amperes)	1070 (7/24/75)	
Type ES-560 (15-560 amperes)		
Type ESM-560 (100-560 amperes)		
Type ES-105 (15-560 amperes)	1077 (11/13/75)	

24.9/14.4 kV

<u>*Lexington Switch and Controls</u>		To obtain operating experience.
Oil circuit recloser,	620 (4/18/57)	
Single phase-A Line, Model M rated 100 amperes	1080 (12/23/75)	
Three phase-A Line, Model 3M rated 100 amperes	1329 (10/9/86)	

*Ratings greater than 100 amp. for 12.5/7.2 kV application, and greater than 200 amp for 24.9/14.4 kV application, are acceptable only with ground trip devices.

be - Reclosers, vacuum interrupter

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
*Cooper Power Systems (McGraw-Edison) Single phase, type V4H, maximum voltage 14.4 kV for 12.5/7.2 and 13.2/7.62 kV	921 (6/26/69)	To obtain experience.
Three phase, type V6H, maximum voltage 14.4 kV for 12.5/7.2 and 13.2/7.62 kV	921 (6/26/69)	To obtain experience.
Three phase type VW rated 560 amperes continuous, maximum voltage 14.4 kV for 12.5/7.2 and 13.2/7.62 kV	1005 (12/7/72)	To obtain experience.
#Three phase type VWE rated 560 amperes continuous, maximum voltage 14.4 kV for 12.5/7.2 kV and 13.2/7.62 kV	1005 (12/7/72)	To obtain experience.
#Three phase type VWVE rated 560 amperes continuous, maximum voltage 27 kV for 24.9/14.4 kV	1014 (4/12/73)	To obtain experience.

*Ratings greater than 100 amp. for 12.5/7.2 kV application, and greater than 200 amp. for 24.9/14.4 kV application, are acceptable only with ground trip devices.

#Not acceptable with load current, bushing CT battery chargers.

Conditional List
be(3)
July 1989

be - Reclosers, vacuum interrupter

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
*Cooper Power Systems (Cont.) (McGraw-Edison) Three phase type VWV rated 560 amperes continuous, maximum voltage 27 kV for 24.9/14.4 kV	1021 (7/19/73)	To obtain experience.
<u>Westinghouse</u>		
Three phase Type ESVA rated 560/800 amps continuous, 12,000 amps symmetrical, maximum voltage 15.5 kV for 12.5/7.2 kV	1259 (5/19/83)	To obtain experience.
Three phase Type ESMVA rated 560 amps continuous, 16,000 amps symmetrical, maximum voltage 15.5 kV for 12.5/7.2 kV	1259 (5/19/83)	To obtain experience.
Three phase Type ESV rated 800 amps continuous, maximum voltage 38 kV for 24.9/14.4 kV	1117 (6/23/77) 1239 (7/29/82)	To obtain experience.

*Ratings greater than 100 amp. for 12.5/7.2 kV application and greater than 200 amp. for 24.9/14.4 kV application, are acceptable only with ground trip devices.

bh - Clevis, Service Deadend

Applicable Specification: "REA Specification for Service Deadend
Clevises," D-8

<u>Manufacturer</u>	<u>Clevis Only*</u>	<u>Clevis with dry process spool</u>	<u>Clevis with wet process spool</u>
Chance	0341	0341-0606	0341-C909-1931
Cooper Power Systems (McGraw-Edison)	DC3F1	-	-
Dixie	D0341	D0341-D	D0341-W
Joslyn	J0313	J0314	-
Kortick	K9250	K9100	K9099
Utilities Service	32136	31136	36136

*Catalog number does not include spool; for spool see Page cm.

bi
July 1989

bi - Gain, Pole

For use with rectangular crossarms

Chance	4092
Continental	CAG-44-5
Flagg (MIF)	PX252
Joslyn	J4092

For braceless crossarms (narrow profile construction)

Reliable/Bethea	GCAF-6A
Continental	DEA-65-10A
Flagg (MIF)	PX182A

Transmission

Grid Gains

	<u>Sizes in inches</u>	
	<u>4" x 4"</u>	<u>4" x 9"</u>
Barron Bethea	PG-44	PG-945
Reliable/Bethea	GSF-44-7	GSFT-95-7
Continental	GGSF-4040-7	GRF-9045-7
Flagg (MIF)	PX122	PX260
Hughes Brothers	1263	1260
Joslyn	J6064	J22533-A

bj
July 1989

bj - Guy Hook

Applicable Specification: Edison Electric Institute Specification TD-11
1951, "Specifications for Guy Hooks and Guy Strain
Plates."

Cooper Power Systems DG4H1
(McGraw-Edison)

Dixie D6584

Joslyn J1019

Kortick K4031

Utilities Service 5310

Chance 6584



bk
July 1989

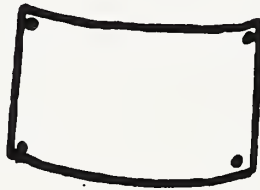
bk - Guy Plate

Applicable Specifications:

Strain Type: Edison Electric Institute Specification TD-11
1951, "Specifications for Guy Hooks and Guy
Strain Plates."

Lift Type: None

	<u>Strain Type</u> <u>4" x 8" x 14 gage</u>	<u>Lift Type</u> <u>2-1/2" x 7" x 1/4", 2 hole</u>
Chance	6575	7898
Cooper Power Systems (McGraw-Edison)	DG1M2	DG4M2
Dixie	D6575	D7888
Joslyn	J1034	J7894
Kortick	K4015	K3511
Power Line Hardware	GSP-1	
Utilities Service	5351	C434



bn
July 1989

bn - clamp, loop deadend

For ACSR

	3/0	2/0	1/0	2	4
ALCOA	-	413	413	412	411
Anderson/Sq. D	LC-74B	LC-71B	LC-70B1	LC-70B	LC-70B
Blackburn	DLC23	DLC2106	DLC2106	DLC2106	DLC2106
Burndy	-	-	UW25R	UW2R	UW2R
C & R	-	-	CRLD-10	CRLD-10	CRLD-10
Electrical Specialty Products	LD-4	LD-2	LD-1	LD-1	LD-1
Fargo	GA-145	GA-145	GA-144	GA-144	GA-144
Reliable/Bethea	ALD-7373-U	ALD-34-U	ALD-1313-U	ALD-1313-U	ALD-1313-U



bo
July 1989

bo - Shackle, anchor

<u>Manufacturer</u>	<u>Catalog Number</u>
Anderson/Sq. D	AS-25
Chance	5801
Continental	AS-25-5-4
Cooper Power Systems (McGraw-Edison)	DC7J1
Dixie	D5801
Flagg	12300
Joslyn	J2742
Kortick	K4481
Lapp	33852
Lindsey	3260
Power Line Hardware	AS-1
Reliable/Bethea	ASH-45
Sur-Loc, Inc.	5500
Utilities Service	4106

br
July 1989

br - Chain Link (End Link)

<u>Manufacturer</u>	<u>Catalog Number</u>
Continental	L-5
Joslyn (Brewer-Titchener)	BT-3082-HT
Lapp	6415-HT
Lindsey	3403
Reliable/Bethea	CL-5

bs
July 1989

bs - Bolt, single upset

Applicable Specifications: "REA Specifications for Single and Double Upset Spool Bolts," D-5

Diameter, inches	5/8	5/8	5/8	5/8
Length, inches	7	8	9	10
Chance		7741	7741-1/2	7742
Cooper* (McGraw-Edison)		DC2E3	DC2E4	DC2E5
Dixie	D7740	D7741	D7741-1/2	D7742
Joslyn	-	J2342-1/2	J2343-1/2	J2344-1/2
Kortick	K4929	K4950	K4930	K4951
Utilities Service	3105-1/2	31053	31053A	31054



*"Static proof" designs available.

bt
July 1989

bt - Wireholder, clevis type
with No. 24 wood screw

(For use with triplex type service cable, Drawing K10C-A)

Chance	0192*
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Cooper Power Systems (McGraw-Edison)	DW5R1*
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Dixie	D075*
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Joslyn	J075*
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*Catalog number does not include insulator. Use secondary type spool insulator with 1-3/4-inch groove diameter. See page cm.

bu
July 1989

bu - Connector, grounding
for transformer or other equipment

<u>Manufacturer</u>	Copper <u>Alloy 1</u>	Plated Copper <u>Alloy 2</u>	Aluminum <u>Alloy 3</u>
Anderson/Square D	GTCL-23A	GTCL-23A-TP	
Blackburn	TTC-4	TTC2P	
Burndy	EQC632C	EQC632C-TN	
Dossert	TGCL8-50	TGCL8-50-SN	
Fargo	GC-207	GC-207P	GA-220
Penn-Union		GSE-C1TN	
Power Line Hardware	TGL-110	TGL-110P	
Tanner		GET-1-TN	

1 - For use with copper type ground wire.

2 - For use with both copper and aluminum type ground wire.

3 - For use with aluminum type ground wire.

bv
July 1989

bv, Rods, armor

(includes standard, double insulator, and tapping rods)

Aluminum or aluminum alloy rods for use on ACSR

Blackburn	Formed Type
Chance	Formed Type
Dulmison	Formed Type
Florida Wire and Cable	Formed Type
Helical Line Products	Formed Type
Preformed Line Products	Formed Type

Copperweld rods for copper or CWC conductor

Helical Line Products	Formed Type
Preformed Line Products	Formed Type

Alumoweld rods for aluminum clad steel (Alumoweld)
overhead ground wire

Helical Line Products	Formed Type
Preformed Line Products	Formed Type

bx
July 1989

bx - Splice, automatic

<u>Copper</u>	<u>Fargo</u>	<u>Reliable</u>
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6	GL-111	61
4	GL-112	41
2 x 3	GL-115	-
1/10 x 7	GL-117	107
2/0 x 7	GL-118	207
3/0 x 7	GL-119	307
4/0 x 7	GL-120	407

CWC

8A	GL-112	
6A	GL-113	47
4A	GL-115	27
2A	GL-117	

ACSR

GL-400 Series* 7650 Series*

Aluminum Alloy
(6201 and 5005)

GL-100A Series AL55 Series
GL-1000A Series

*For use on distribution conductors 4/0 and smaller only.

bx - Splice, automatic

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
DISTRIBUTION		
<u>Fargo</u> AWAC 4 - 4/3 GLA-105 AWAC 2 - 4/3 GLA-110 AWAC 1/0 - 4/3 GLA-115	1087 (4/1/76)	1. To obtain experience 2. For use on distribu- tion systems only.
266.8 kcmil ACSR 18/1 GL-1315A 336.4 kcmil ACSR 18/1 GL-1315A 477 kcmil ACSR 18/1 GL-1325A	B55 (2/12/86)	Same as above.

DISTRIBUTION AND TRANSMISSION

<u>Fargo</u> 266.8 kcmil ACSR 26/7 336.4 kcmil ACSR 26/7 477 kcmil ACSR 26/7	1384 (5/18/89)	To obtain experience
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by
July 1989

by - Deadend, Automatic and Formed Type

Conductor Size

<u>Cu</u>	<u>CWC</u>	<u>Fargo</u>	<u>Reliable</u>
-	4A	GD-515	27-SDS
-	6A	GD-513	47-SDS
-	8A	GD-512	-
2 x 3	-	GD-515	271
4	-	GD-512	41LD
6	-	GD-511	61LD

ACSR

*Fargo	GD-400 Series
*Preformed	OG-9360 thru 9366 #OHDE-9534 thru 9540, 4577
*Reliable	7650 Series

#may only be used with a spool insulator (Item cm) and appropriate clevis for neutral and secondary applications.

Aluminum Alloy
(6201 and 5005)

Fargo	GD-A Series
Preformed	OG-9360 thru 9366
Reliable	AL Series

*For use on distribution conductors 4/0 and smaller only.

Conditional List
by
July 1989

by - Deadends, automatic and formed type

FORMED TYPE

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Preformed Line Products</u>		
AWAC 4 - 4/3 DG-4560	993 (6/8/72)	To obtain experience.
AWAC 2 - 4/3 DG-4562.		
AWAC 1/0 - 4/3 DG-4565		

AUTOMATIC TYPE

<u>Reliable</u>		
AWAC 4 - 4/3 5201	1026 (9/27/73)	To obtain experience.
AWAC 2 - 4/3 5202	1035 (2/21/74)	
AWAC 1/0 - 4/3 5204		
<u>Fargo</u>		
AWAC 4 - 4/3 GDA-235	1087 (4/1/76)	To obtain experience.
AWAC 2 - 4/3 GDA-240		
AWAC 1/0 - 4/3 GDA-245		
266.8 kcmil ACSR 18/1 GD-5315A	B55 (2/12/86)	1. To obtain experience
336.4 kcmil ACSR 18/1 GD-5315A		2. For use on distribu- tion lines only.
477 kcmil ACSR 18/1 GD-5325A		

bz
July 1989

bz - Switch, oil

12.5/7.2 kV

	<u>Type</u>	<u>Description</u>
Cooper Power Systems (McGraw-Edison)	NR*	Single-phase, remote elec. control, 200 amp.
	VR*	Three-phase, remote elec. control, 400 amp.
General Electric	FKC-2	Single and three-phase, manual, 200 amp.
	FKC-2*	Single and three-phase, remote control, 200 amp.
Westinghouse	CSL**	Single-phase, manual and remote manual or elec. control, 200 amp. Three-phase, remote manual or elec. control, 200 amp.

*Control equipment should be selected in accordance with the requirements of individual installations.

**This item is also available in a special design for use in areas where corrosion is a serious problem.

Conditional List
bz
July 1989

bz - Switch, oil

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Cooper Power Systems</u> (McGraw-Edison)		
Capacitor oil switch Type TSC, 38 kV max. 100 ampere capacitor switch 300 ampere load switch	940 4/2/70	To obtain experience.
Oil switch with 125 kV BIL accessory Type NR, 15 kV, single- phase, remote electric control, 200 amp. at 75 to 100 percent power factor	1046 7/25/74	1. To obtain experience. 2. For use on single- phase taps of 24.9/14.4 kV multi- grounded wye systems.
<u>Trinetics</u>	1284	To obtain experience
Capacitor, oil switch Type CSD-95, 95 kV BIL 15 kV Max. 200amp.	8/2/84	
Oil switch with 125 kV BIL accessory, CSD-125, 15 kV, single-phase, 200 amp	1290 11/29/84 1351 10/29/87	1. To obtain experience 2. For use on single- phase taps of 24.9/14.4 kV multi- grounded wye systems.

cg - Switch, air, three-pole, group-operated
NEMA standard switches for station and line structures

Manufacturer	Acceptable Mounting on Structures	Tilting Ins. Type	Ins. kV	Vertical Break Type	Side Break Type	Center Break Type	Double Break Type
ABB	Horizontal			TTR6	15-345		
A. B. Chance	Horizontal				D6(L)15-34.5 D6(L)15-34.5 D6(L)15-34.5		
	Phase over Vertical						
Johnson	Horizontal			VIP	15-230	LS	15-69
Joslyn (Hi-Voltage)	Horizontal			RF-2(VL)	15-230	RB-1(VL)	15-25
	Horizontal					RB-1*	15-115
Kearney	Horizontal			AR	60-P	15-69	
MEMCO	Horizontal	AgF	15-69	EA	15-345	EE	69-230
	Horizontal	AgC	15-69			R14-C	15-46
G & W Electric Co.	Horizontal			MK-40	15-69	PMB-40A	15-69
Powerdyne (Kearney)	Horizontal					LPC	69-230
	Phase over Phase					V2-V4	15-230
						V2	15-23

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

*These switches may be purchased with reduced voltage vacuum interrupters and may be applied for loop sectionalizing duty when peak recovery voltage does not exceed 25 kV

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg - Switch, air, three-pole, group-operated NEMA standard switches for station and line structures						
Manufacturer	Acceptable Mounting on Structures	Tilting Ins. Type	Vertical Break Type	Side Break Type	Center Break Type	Double Break Type
S & C	Horizontal Phase over Phase Vertical		Alduti(L)15-34.5 Alduti(L)15-25 Alduti(L)*15-34.5	Alduti(L)15-25 Alduti(L)15-25 Alduti(L)15-25		Alduti(L)34.5-46 Alduti(L)34.5-46 Alduti(L)*34.5-46
SEECO	Phase over Phase			GOABS(VL) 15-69		
Siemens-Allis	Horizontal		TA(VL) 15-69 AVB(VL)**115-345	SSB-T 15-69	CCB-115-230 CBL-2 115-230	
Southern States	Horizontal		EV 15-230	57K 15-69	EC 115-230	
Turner	Phase over Phase Horizontal Horizontal		TH1(VL) 15-161	(10, 20, 30)(VL) 15-161 10(VL) 15-161		
USCO	Horizontal Horizontal Phase over Phase		AGT(VL)**15-230	GSH-4(VL)15-138 GSH-4(VL)15-138	AGCH- **15-345 AGCH-V**34.5-230 GCH 15-23	

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

*These switches, except 34.5 kV Alduti vertical break, are available and accepted with the S & C type SMD substation fuse cutouts listed on page af-3.

** Also available in bronze in some ratings.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg - Switch, air, three pole, group operated

(FOR USE ON STEEL SUBSTATION STRUCTURES)

<u>Manufacturer</u>	<u>Mounting</u>	<u>Vertical</u>		<u>Side Break</u>	
		<u>Type</u>	<u>kV</u>	<u>Type</u>	<u>kV</u>
Chance	Vertical			D7(L)	15-27
	Horizontal			D7(L)	15-27
S & C	Phase-over-Phase	Alduti(L)	34.5 (200 kV BIL)	Alduti(L)	34.5 (200 kV BIL)
	Vertical	Alduti (L)	34.5 (200 kV BIL)		

(L) Means gas or solid material full-load interrupters are accepted and available.

cg - Switch, air, three-pole, group operated
(not Suitable for Substation Use)

<u>Manufacturer</u>	<u>Acceptable Mounting</u>	<u>Vertical Break Type</u> kV	<u>Side Break Type</u> kV	<u>Center Break Type</u> kV
Chance	Horizontal Phase over Phase Vertical		D6(L)15-34.5 D6(L)15-34.5 D7(L)15-34.5	
Kearney/KPF	Horizontal Phase over Phase Phase over Phase	SV-202 23	A202-A208 15-110 A202(L) 15-21 W202(L) 15-21 MD202(L) 15-21	
Powerdyne (Kearney)	Horizontal Phase over Phase			V2 15-23 V2 15-23

(L) Means gas or solid material full-load interrupters are accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

NOTE: Phase-over-phase mounted switches are not acceptable above 25 kV class unless equipped with full-load interrupters. Switches of 15 kV and 25 kV classes with individual phases mounted on wood crossarms or poles must be supplied with insulated interphase and control rods.

cg - Switch, three-pole, group-operated
(Factory Preassembled)

<u>Manufacturer</u>	<u>Acceptable Mounting on Structures</u>	<u>Vertical Break</u>		<u>Side Break</u>	
		<u>Type</u>	<u>kV</u>	<u>Type</u>	<u>kV</u>
Chance	Horizontal (A)			D7(L)15-27	
	Phase over phase (A)			D7(L)15-27	
	Vertical (A)			D7(L)15-27	
	Horizontal (B)			D7(L)34.5	
	Phase over phase (B)			D7(L)34.5	
	Vertical (B)			D7(L)34.5	
Kearney/KPF	Horizontal (A)			GB202-H(L) 15-25	
	Phase over phase (A)			GB202-V(L) 15-25	
S&C	Horizontal (A)			Alduti(L)15-25	
				Alduti(L)34.5	
				(200 kV BIL)	
	Phase over phase (A)			Alduti(L)25	
				Alduti(L)34.5	
				(200 kV BIL)	
	Vertical (A)			Alduti(L)15-25	
				Alduti(L)34.5	
				(200 kV BIL)	
	Phase over phase (B)	Alduti(L)34.5		Alduti(L)34.5	
	Vertical (B)	Alduti(L)34.5			
Westinghouse	Horizontal (A)			SLB-3(L)15-25	

(L) Means gas or solid material full-load interrupters are accepted and available.

(A) Not suitable for substation use.

(B) For station and transmission use only. The steel crossarm base must be grounded with an adequate grounding connector. 200 kV BIL only.

NOTE: Switches with factory-assembled crossarm type bases for distribution lines must have nonconducting crossarm type bases, nonconducting braces, and insulated interphase and control rods, except as otherwise noted.

cg - Switch, air, three-pole, group operated

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Southern States</u> "Pole-Pak" 15-23 kV	800 (8/20/64)	To obtain experience.
Type ES; 15, 23 and 34.5 kV (horizontal upright models only)	897 (7/11/68)	1. To obtain experience. 2. For 15 kV and 23 kV distribution lines: insulated interphase and control rod spacers required. See REA Draw- ings M3-15 and VM3-16 3. NEMA insulators and steel interphase base required for trans- mission line structure as in TM-3. 4. Acceptable on steel substations 15 through 34.5 kV with NEMA insulators and uninsul- ated interphase rods.
Type 57L sidebreak, 115-161 kV, 600 and 1200 amp., horizontal upright	1067 (6/12/75)	To obtain experience.
<u>G & W Electric Company</u> Type MK-40A 15 kV through 230 kV (horizontal upright mounting)	912 (2/20/69)	1. To obtain experience. 2. Insulated interphase and control rods re- quired on 15 kV and 23 kV models used on wood structures. 3. Steel interphase base required when mounted as in REA Drawing TM-3.

Conditional List
cg(2)
July 1989

cg - Switch, air, three-pole, group-operated

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
G & W Electric Company (Cont'd) "Mark 40" 115 kV through 345 kV (horizontal upright mounting)	1005 (12/7/72)	To obtain experience.
Type LPV, 3-pole 72.5-272 kV, 1200 amp., 1600 amp., 2000 amp., center sidebreak for horizontal mounting.	1064 (5/1/75)	To obtain experience.
Siemens-Allis Type CBL-T, 15-69 kV 600 and 1200 amp (center break, horizontal upright mounting)	1100 (10/21/76)	1. To obtain experience. 2. Insulated interphase and control rods required on 15 kV and 25 kV models used on wood structures.
<u>Morgan</u> Type VBV(VL), Vertical break vee Pole top mtg., 15-34 kV H-frame mtg., 46-230 kV Substation mtg., 15-230 kV	1056 (1/2/75) 1146 (8/31/78) 1281 (5/31/84)	1. To obtain experience. 2. Pole mounted switches must be supplied with insulated interphase and control rods.
Type CBV, center break vee Horizontal pole top mounting, 15-34.5 kV Phase-over-Phase mounting, 15-23 kV H-frame and substation mounting, 15-230 kV	1056 (1/2/75) 1281 (5/31/84)	Same as above.

(L) Means full-load interrupter accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

cg - Switch, Air, Three-Pole, Group Operated

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>SEECO</u> GOABS (VL) Vacuum interrupter type -161 kV	1201 (12/4/80)	To obtain experience.
<u>S & C</u> Line-rupter with SF ₆ inter- rupter. Horizontal mounted 69-230 kV Vertical mounted 69-161 kV	1202 (12/18/80)	To obtain experience.
Omni-Rupter (L) Side-break, horizontal phase-over-phase, and vertical mounting, with non-conducting crossarm type base and insulated interphase and control rods, 15 kV and 25kV	1355 (1/14/88) 1371 (10/6/88)	To obtain experience. " " "

(L) Means full-load interrupter accepted and available.

(VL) Means vacuum full-load interrupters are accepted and available.

ci
July 1989

ci - Clevis, Thimble, Side-Opening

Numbers listed will accommodate: No. 6 thru 2/0 Copper
No. 8A thru 2A Copperweld-Copper
No. 4 thru 3/0 ACSR

Joslyn (Brewer Titchener) 2401

cj - Pole Ground Wire

Soft annealed iron, BB Grade, class C galvanizing
(For pole protection only)

Size
1.15 Ohms/1000 ft., max.

Manufacturer

Bethlehem Steel	3-wire, 5/16 inch
Indiana Steel and Wire	3-wire, 5/16 inch
Southwire	3-wire, 5/16 inch
U. S. Steel	3-wire, 5/16 inch
National Strand Products	3-wire, 5/16 inch

Copper, soft annealed solid
ASTM Specification B3

Manufacturer
(See page av-2)

Aluminum (for above ground use only)
Three-quarter hard-drawn EC grade

Manufacturer
(See page av-1)

Aluminum Alloy (for above ground use only)

<u>Manufacturer</u>	<u>Type</u>
ALCAN	6201
ALCOA	6201
American Electrical	6201
Kaiser	6201
Reynolds	5005
Southwire	6201, 5005

Copper-Clad Steel, Annealed 40 percent Conductivity

<u>Manufacturer</u>	<u>Size</u>
Copperweld Southern*	No. 6

* Not for use on distribution when neutral is larger than #1/0 ACSR.

Conditional List

cj
July 1989

cj - Pole Ground Wire
Aluminum Alloy (for above ground use only)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>ALCOA</u> 8177	1248 (12/2/82)	To obtain experience.

ck - clamp, anchor rod bonding

For Standard and Drive Type Rods

<u>Diam. of Rod</u>	<u>Type of Eye</u>	<u>5/8"</u>	<u>3/4"</u>	<u>1"</u>
C & R Products	Single	CRBC-1	CRBC-1	CRBC-1
	Twin	CRBC-2	CRBC-2	CRBC-2
	Triple	-	CRBC-3	CRBC-3
Chance	Single	G5060	G5060	G5060
	Twin	G5061	G5061	G5061
	Triple	-	G5063	G5063
Cooper Power Systems (McGraw-Edison)	Single	DA1B1	DA1B1	DA1B1
	Twin	DA2B1	DA2B1	DA2B1
Dixie	Single	D3143	D3143	D3143
	Twin	-	D3144	D3144
	Triple	-	D3145	D3145
Joslyn	Single	3230	3230	3230
	Twin	-	3231	3231
	Triple	-	3233	3233
Kortick	Single	K3147	K3147	-
	Twin	-	K3148	K3148
	Triple	-	K3149	K3149
Utilities Service	Single	CG5060	CG5060	-
	Twin	-	CG5061	CG5061
	Triple	-	CG5063	CG5063

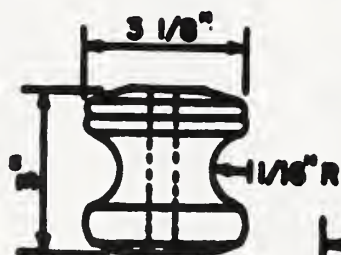
For Power Installed Screw Anchors

C & R Products	Single	CRBC-4	CRBC-5	-
Chance	Single	G5067	G5068	-
Joslyn	Single	PIBC-4	PIBC-5	-

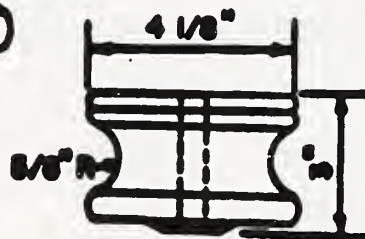
cm
July 1989

cm - Insulator, Spool

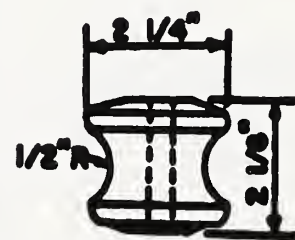
Type:	<u>Secondary (Wet Process)</u>		<u>Service</u>	
			<u>Wet Process</u>	<u>Dry Process</u>
Groove Diameter:	<u>1-3/4"</u>	<u>3"</u>	<u>1-3/8"</u>	<u>1-3/8"</u>
Chance	C909-1032	C909-1034	C909-1031	0606
Cooper Power Systems (McGraw-Edison)	DE4S3	DE5S3	DE2S2	DE2S1
Hughes	2102	-	-	-
Joslyn	J151	J0101	J150	J100
Kortick	K516	K522	K513	K514
Porcelain Products (Knox)	5101	5119	5107	5207
Universal	1082	-	-	-
Utilities Service	205	31221	208	207
Victor Insulators, Inc.	2012	2026	2011	-



1-3/4" Groove Diameter



3" Groove Diameter



1-3/8" Groove Diameter

cp - Deadend, Compression Type

ACSR

<u>Conductor Size</u>	<u>Alcoa</u>	<u>Anderson/Sq. D</u>
1/0	Order by	VCD-50R
2/0	Conductor	thru
3/0	Size and	VCD-61R
4/0	<u>Stranding</u>	"
266.8 kcmil 18/1		VCD-80-R
336.4 kcmil 18/1		VCD-80-R
477 kcmil 18/1		VCD-812-R
266.8 kcmil 26/7	2-piece	VCD-831-1-RM
336.4 kcmil 26/7	alloy	VCD-831-1-RM
477 kcmil 26/7	compression	VCD-832-2-RM
556.5 kcmil 26/7	Type VES or	VCD-833-3-RM
795 kcmil 26/7	HES	VCD-835-4RM
954 kcmil 54/7	"	VCD-835-4RM

<u>Conductor Size</u>	<u>Burndy</u>	<u>Fargo</u>	<u>Kearney</u>	<u>Homac</u>
1/0	Type Y-W	SEDA-8129	104000	Order by
2/0	"	SEDA-7729	thru	Conductor
3/0	"	SEDA-7829	104000-03	Size and
4/0	"	SEDA-7929	"	Stranding
266.8 kcmil 18/1				"
336.8 kcmil 18/1				"
477 kcmil 18/1				"
266.8 kcmil 26/7	"	Uni-Grip	104000-05	
336.4 kcmil 26/7	Type YTW	one die	thru	
477 kcmil 26/7	"	system	104000-14	
556.5 kcmil 26/7	"	Order by	"	"
795 kcmil 26/7	"	conductor size		
954 kcmil 54/7	"	and stranding		

cp-2
July 1989

cp - Deadend, Compression Type

ACSR
Adjustable

Fargo
Homac

Order by conductor size and stranding

Aluminum Alloy
(6201 and 5005)
4 thru 4/0

Conductor Size:

Anderson/Sq. D

Type VCD, Order by conductor size.

	<u>Copper</u>		
<u>Conductor Size:</u>	<u>2 x 3</u>	<u>4</u>	<u>6</u>
National Tel. Supply	71-258/3X	71-204-P	71-162-J

	<u>Copperweld-Copper</u>	
<u>Conductor Size:</u>	6A	8A
National Tel. Supply	71-6A-P	71-8A-P

Conditional List
cp
July 1989

cp - Deadend, compression type

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Burndy	1050 (9/19/74)	To obtain experience.
AWAC 4-4/3 YTW7M10T		
AWAC 2-4/3 YTW7M9T		
AWAC 1/0-4/3 YTW7M7T		

cq
July 1989

cq - Deadend, Secondary

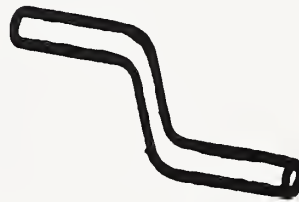
(For use on secondary deadends only)

Copper
Offset Compression

Conductor Size:	4	6
National Telephone Supply	91-204-P	91-162-J

Copperweld-Copper
Offset Compression

Conductor Size:	6A	8A
National Telephone Supply	91-6A-P	91-8A-P



Copperweld-Copper
Automatic Deadend

Conductor Size:	6A	8A
Reliable	47FD	

cr
July 1989

cr - Bracket, Angle Suspension

Applicable Specifications: "REA Specification for Angle Suspension Brackets," DT-4

<u>Manufacturer</u>	<u>Distribution 5/8" Diam.</u>	<u>Transmission 3/4" Diam.</u>
Chance		5728
Cooper Power Systems (McGraw-Edison)	DC8E1	
Joslyn	J7935	J7936
Kortick	K6231	K6230
Utilities Service	545	546

Angle Bracket, Swinging

Applicable Specification: T-8
Drawing : TM-111A, TM-111B

Swinging angle bracket with hardware and fittings (for 230 kV transmission)

<u>Manufacturer</u>	<u>TM-111A</u>	<u>TM-111B</u>	<u>Type #1</u>	<u>Type #2</u>
American Crossarm & Conduit Company	AC8801	AC8802	X	X
Brooks	64233A	64233B	X	
Hughes	2848	2848	X	X
Joslyn	REA 64-8A	REA 64-8B	X	

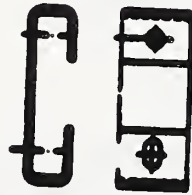
CS
July 1989

cs - Bracket, Pole Top Pin

For Transmission and 24.9/14.4 kV Distribution

Applicable Specifications: "REA Specifications for Pole Top
Brackets for Channel Type Pins,"
D-14

Chance	2157
Cooper Power Systems (McGraw-Edison)	DP3A1
Joslyn	J2045
Kortick	K8130
Utilities Service	36690



ct
July 1989

ct - Plate, Double Arming

<u>Manufacturer</u>	<u>4" x 1/2" x 24"</u>	<u>4" x 1/4" x 17"</u>
Chance	5844	5819
Cooper Power Systems (McGraw-Edison)	DP21A1	DP23A3
Dixie	D5844	D5845
Joslyn	J1600	J1607
Kortick	K1454	K1465
Power Line Hardware	-	DAP-17
Utilities Service	4117	-

CU
July 1989

cu - Brace, crossarm, wood

Span, inches	60	60
Drop, inches	<u>18</u>	<u>30</u>
Aluma-Form	6018	6030
American Crossarm & Conduit Company	320	325
Brooks	446060-180D	446060-300D
Cascadian	15018	15030
Dis-Tran	DT-60R	
Hatheway Patterson	320-R	325-R
Hughes Brothers	2045-CC	2045-D
Joslyn	J4760	J4730
Utilities Structures Engineering Incorporated	CU-60-18	CU-60-30

Braces listed below have 26-inch hole spacing. They are to be used in place of the flat steel braces previously listed on page h.

Aluma-Form	AF626
American Crossarm & Conduit	600
Brooks	58128
Hatheway Patterson	7026
Hughes Brothers	2023
Joslyn	J5526

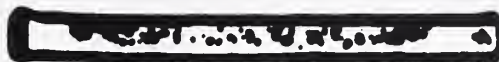
Brace, crossarm, fiber reinforced plastic

Continental	CRB-28
Hughes Brothers	533
Tranpol	CAB-28
Stanley Flagg	FCB26

cx - Splice, oval tube

<u>Copper</u>				
<u>Conductor Size:</u>	<u>0 x 7</u>	<u>2 x 3</u>	<u>4</u>	<u>6</u>
National Tel. Supply	464	463	459	457

<u>Copperweld-Copper</u>		
<u>Conductor Size:</u>	<u>6A</u>	<u>8A</u>
National Tel. Supply	460	459



cy-1
July 1989

cy - Splice, Compression
ACSR

Conductor Size	Alcoa	Anderson/ Sq. D	Burndy
4 6/1	2-piece	VC-36R	"Unisplice"
4 7/1	Order	VC-36R	(1-piece)
2 6/1	by	VC-36R	or Y-S
2 7/1	Conductor	VC-36R	(2-piece)
1/0	Size	VC-50R	Order by
2/0	and	VC-50R	Conductor
3/0	Stranding	VC-61R	Size and
4/0	"	VC-61R	Stranding
266.8 kcmil 18/1		VC-80-R	
336.4 kcmil 18/1		VC-80-R	
477 kcmil 18/1		VC-90-R	
266.8 kcmil 26/7	2-piece	VC-831-1-RM	2-piece
336.4 kcmil 26/7	Compression	VC-831-1-RM	Type YTS
477 kcmil 26/7	Alloy Type	VC-832-2-RM	"
556.6 kcmil 26/7	CJ	VC-833-3-RM	"
795 kcmil 26/7		VC-835-4RM	"
954 kcmil 54/7		VC-835-4RM	"

Conductor Size	Fargo	Blackburn	Kearney 2 pc.	1 pc.
4 6/1		Type RC		OH4-61-71AS
4 7/1		1-piece		OH4-61-71AS
2 6/1		Order		OH2-61-71AS
2 7/1		by		OH2-61-71AS
1/0	TJA-8129	Conductor	OH1/0-61A	OH1/0-61AS
2/0	TJA-7729	Size	OHR2/0-61A	
3/0	TJA-7829	and	OHR3/0-61A	
4/0	TJA-7929	Stranding	HR4/0-61A	
266.8 kcmil 18/1		#4 to 4/0		
336.4 kcmil 18/1				
477 kcmil 18/1				
266.8 kcmil 26/7	Uni-grip		HR-266-267A	
336.4 kcmil 26/7	one die		HR336-267A	
477 kcmil 26/7	system		HR-477-267A	
556.5 kcmil 26/7	Order by		HR-556-267A	
795 kcmil 26.7	conductor size			
954 kcmil 54/7	and stranding			

cy - Splice, Compression

ACSR

<u>Conductor Size</u>	<u>Nat. Tel. Supply</u>	<u>Homac</u>	<u>ESP</u>
4 6/1	"Nicopress"	"Tension	FTR-4
4 7/1	(1-pc. or 2-pc.)	splicer"	FTR-4
2 6/1	Order by Conduc-	(1-piece or	FTR-2
2 7/1	tor Size and	2-piece	FTR-2.5
1/0	Stranding	Order by	FTR-1/0
2/0	2-pc.	Conductor	FTR-2/0.5
3/0	"	Size and	FTR-3/0
4/0	"	Stranding	FTR-4/0
266.8 kcmil 26/7	"	2-pc.	
336.4 kcmil 26/7	"	"	
477 kcmil 26/7	"	"	
556.5 kcmil 26/7	"	"	
795 kcmil 26/7			
954 kcmil 54/7			

Splice, Compression

Copper and Copperweld-Copper

<u>Conductor Size</u>	<u>Anderson/ Sq. D</u>	<u>Burndy</u>	<u>Kearney</u>	<u>National Tel. Supply</u>
6 cu	VCC-28	YDS6W	OH6C	1-162/J
4 cu	VCC-28	YDS4W	OH4C	1-204/P
2 x 3 cu	-	YDS2C-3	OH2-3CX	1-258/3X
0 x 7 cu	-	YDS25	OH1-7C	1-325/7F6
8A CWC	VCC-28	YDS8KT	OHR8ACW	1-8A-P
6A CWC	VCC-28	YDS6KT	OHR6ACW	1-6A-P
4A CWC	VCC-37	YDS4KT	OHR4ACW	1-4A-X
2A CWC	VCC-43	-	-	-

<u>Conductor Size</u>	<u>Homac</u>
6 cu	J2C3
4 cu	L2C5
2 x 3 cu	S2C7
0 x 7 cu	U2C9
8A CWC	L2E1
6A CWC	L2E3
4A CWC	Q2E5
2A CWC	U2E7

cy - Splice, compression
(one-piece)

(For 6201 and 5005 Aluminum Alloy Conductors)

<u>Conductor Size</u>	<u>Anderson/ Square D</u>	<u>Burndy</u>	<u>Blackburn</u>
#4 thru 4/0	Type VC-R Order by Conductor Size and Stranding	"Unisplice" Order by Conductor Size and Stranding	Type RC Order by Conductor Size and Stranding
<u>Conductor Size</u>	<u>Homac</u>	<u>ESP</u>	
#4 thru 4/0	"Tension Splicer Order by Conductor Size and Stranding	Type FTR order by size and stranding	

Conditional List

cy
July 1989

cy - Splice, compression

1-piece splice for ACSR

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
*ALCOA "Jiffy Joint"	704 (11/10/60)	To obtain experience.

1-piece splice for AWAC

Burndy AWAC 4-4/3 YDS7M10T AWAC 2-4/3 YDS7M9T AWAC 1/0-4/3 YDS7M7T	1050 (9/19/74)	To obtain experience.
--	----------------	-----------------------

*Satisfactory for use with 6201 and 5005 all aluminum alloy conductor through 4/0 and 19 strand conductors of sizes 266,800 CM and 477,000 CM.

cz - Splice for Steel Strand (Overhead Ground Wire)

Compression

Single Sleeve Only

High Strength Steel
3/8" 7/16" 5/16" 3/8" 7/16" Extra High Strength Aluminum Clad Steel
7 No. 9 AWG 7 No. 8 AWG 7 No. 7 AWG

Alcoa		4914.386	4916.453			
Burndy	YTS375E	YTS438E			YDS7M9T	YDS7M7T
Fargo	811425	811630	811222	811425	811630	811427
Homac	29714					
Kearney	HR-3/8-3-7S					
National.						
Tel.						
Supply	5-7/120692	5-7/145J22				

Steel and Aluminum Sleeves

Homac 29714 & 28414
(Two piece)

Automatic

Reliable	5002	5043	5041	5042	5043	5042	5042	5043
----------	------	------	------	------	------	------	------	------

Bolted Type

Electroline GD-537

Formed Type

Chance	10SS 3/8C	16SS 7/16C	6SS 5/16C	10SS 3/8C	16SS 7/16C
Helical					
Line					
Products	HS-310-3/8"	HS-311-7/16"			

da
July 1989

da - Bracket, insulated

	<u>Bracket without Insulator</u>	<u>Bracket with 1-3/4" Spool Insulator</u>	<u>Bracket with 3" Spool Insulator</u>
Chance	0327	0327-C909-1032	0327-C909-1034
Cooper (McGraw- Edison)	DC2C1	-	-
Dixie	D0327	-	-
Hughes Brothers	1077LI	1077SI	1077I
Joslyn	J1300	J1301	J1303
Kortick	K9278	K9081	K9082

dh - Ground, pole

(For system grounds see ground rods on page ai.)

Manufacturer

Catalog Number

Galvanized Steel Plate With Insulated
Copper Lead

(For connecting to a copper or aluminum
ground wire above ground.)

Cooper Power Systems
(McGraw-Edison)

DN13M1

Joslyn
Power Line Hardware

J055W
PGPS-56CL8

Galvanized Steel Plate with Connector
(For connecting to a galvanized iron ground wire)

Joslyn

J055

Power Line Hardware

PGPS-56C

Copper Plate

Blackburn
Drabco
Homac
Joslyn
Power Line Hardware

GP-100
D 101
5575
J9196
PGPC-56

d1
July 1989

d1 - Pipe Spacer

3/4" diameter x 1-1/2" length

<u>Manufacturer</u>	<u>Catalog Number</u>
Chance	2237
Cooper Power Systems (McGraw-Edison)	DM3P2
Dixie	D2031
Joslyn	J2031
Utilities Service	36695

dm
July 1989

dm - Bracket, transformer
(For cluster mounting of two or three transformers on pole)

<u>Manufacturer</u>	<u>Transformer Size, kVA</u>	<u>Band Type</u>	<u>Through Bolt Type</u>
Aluma-Form	3-50 75-100	6M3-6 15M3-6	3MW-24 12MW-24
Chance	3-50 75-100	C212-8002 C212-8003 C212-8005	C212-0142 C212-0146
Cooper Power Systems (McGraw-Edison)	3-25 DT25C1 37 1/2-50 75-100	(Use 3 no. DT17A1 Adapter Plates) DT25C4 DT25C4	DT6C1 DT7C1 DT8C1
Dixie	3-25 37-1/2-50 75-100		D0565 D-0561-CP
Hughes	3-25 37-1/2-50 75-100		3021 3020 3020 with adapter plates and back plate.
Joslyn	3-25 24352, 24353 with adapter plate 24524 37-1/2-50 24352, 24353 (two needed) 75-100 24352, 24353 (two needed)		J6865 J6864 J6866
Turner	3-25 37-1/2-50 75-100		305-25 305-100 305-100
<u>For mounting of two transformers</u>			
Aluma-Form	3-100 3-50		DM-4M2 DM-2M2
Chance	3-100		C212-0001
Hughes	3-50		3022
Turner	3-50		205-25

dp
July 1989

dp - Clamp, ground wire

Transmission

For grounding steel towers and substation structures

Bolt Included

(For use with copper ground wires)

<u>Manufacturer</u>	<u>Catalog Number</u>
Penn-Union	GH-30-C-A1
Royal Switchgear	12202-T (Type LCS)
UTM	910-027-01

For use in: Pole Grounding Assembly TM-9
Capacitor Assemblies M9-11, M9-12 and M9-13

<u>Manufacturer</u>	<u>For 5/8" Bolt</u>	<u>For 3/4" Bolt</u>
Continental	SBL-33	-
Cooper Power Systems (McGraw-Edison)	DG1C5	DG1C6
Dixie	D-5452	-
Flagg (MIF)	PA-166A	-
Joslyn	J1163	J1164

dq
July 1989

dq - Eye Screw, Elliptical

For use in deadending triplex type service cable, Drawing K10C.

<u>Manufacturer</u>	<u>Catalog Number</u>
Cooper Power Systems (McGraw-Edison)	DF7E6
Joslyn	J8930

dr
July 1989

dr - Clevis, conduit, insulated

For use in deadending triplex service cable, Drawing K16C.
Applicable Specifications: "REA Specifications for Insulated
Conduit Clevises and Conduit Wire-
holders for Pipe Mast Deadends," D-16

Cooper Power Systems
(McGraw-Edison)

DW8M1*

Joslyn

J0311*

*Insulator not included. See page cm for spool insulator.

ds
July 1989

ds - Wireholder, conduit

For use in deadending open wire services on pipe masts, Drawing K17

Applicable Specifications: "REA Specifications for Insulated Conduit
Clevises and Conduit Wireholders," D-16

<u>Manufacturer</u>	<u>Catalog Number</u>
Chance	C207-0075
Cooper Power Systems (McGraw-Edison)	DW2C3
Dixie	D-4010
Joslyn	J0588

dt
July 1989

dt - Deadend, service

For deadending triplex type service cable, Drawing K10C.

<u>Manufacturer</u>	<u>ACSR Size</u>	<u>Wedge Type</u>	<u>Catalog Number</u> <u>Formed Type</u>
Blackburn	4	W6-4AA	-
	2	W6-2AA	-
	1/0	W2-0AA	-
Burndy	4	CW2R-1	-
Chance	4	-	CSG-030
	2	-	CSG-050
	1/0	-	CSG-070
Helical Line Products	4	-	HSG-514
	2	-	HSG-518
	1/0	-	HSG-522
Joslyn	4 & 2	R7295	-
	1/0	R7287	-
Penn-Union	4 & 2	WDC-2S	-
	1/0	WDC-10S	-
Preformed Line Products	4	-	SG-4502
	2	-	SG-4504
	1/0	-	SG-4506
Reliable	4 & 2	7295	-
	1/0	7287	-

du
July 1989

du - Link, Extension

DISTRIBUTION

<u>Manufacturer</u>	<u>Catalog Number</u>
Chance	C207-0112
Continental	CEL-14
Cooper (McGraw-Edison)	DC33B6
Flagg (MIF)	PA319
Reliable/Bethea	LCE-14
Utilities Service	495

TRANSMISSION

(25,000 lbs. min. strength)

Joslyn	J26082
Reliable/Bethea Products	ASM 7209-1-BC

Guy Extension Link
(For "H" Structure)

<u>Manufacturer</u>	<u>One Guy Attachment</u>	<u>Two Guy Attachment</u>
Joslyn	J22421	J26025

NOTE: The distribution extension links may be substituted for anchor shackle (Item bo), eye bolt (Item o) and eye nut (Item aa) for both small and large conductor drawings shown in REA Form 803 and REA Bulletin 50-3 at the option of the owner.

Conditional List
du(1)
July 1989

du - Connecting Links

Conditions: To obtain experience in conjunction with pole bands [Item fv(1)]
Strength Rating: 25,000 lbs. ultimate loading.

<u>Manufacturer</u>	<u>Link to guy</u>	<u>Size</u>	<u>Meeting No. and Date</u>
Hughes	3154	3/8" x 2" x 9-1/2"	1172
	<u>Link to Insulators</u>		9/20/79
Hughes	3176	3/8" x 3" x 9-1/2"	1172
			9/20/79
	<u>Link to guy</u>		
Joslyn	J26033	3/8" x 2" x 9-1/2"	1292
			1/10/85
	<u>Link to Insulators</u>		
Joslyn	J26034	3/8" x 3" x 9-1/2"	1292
			1/10/85

dy
July 1989

dy - Bolt, eye, double arming

Applicable Specification: ANSI C135.4, "Standards for Galvanized Ferrous Eye Bolts and Nuts for Overhead Line Construction."

Applicable Sizes : 5/8 inch, 14 through 26 inch length
3/4 inch, 14 through 26 inch length

The following manufacturers have shown compliance with the applicable specifications:

A. B. Chance Company
*Cooper Power Systems (McGraw-Edison)
Dixie Electrical Manufacturing Company
Joslyn Manufacturing and Supply Company
Kortick Manufacturing Company
Utilities Service Company

*"Static proof" designs available.



dz
July 1989

dz - Clip, Guy Wire

<u>Manufacturer</u>	<u>5/16"</u>	<u>3/8"</u>	<u>7/16"</u>	<u>1/2"</u>
Chance	6453	6454	6455	6456
Cooper Power Systems (McGraw-Edison)	DJ17C6	DJ17C8	DJ17C10	DJ17C12
Utilities Service	4953	4954	4955	4956

ea - Insulator and Stud, post type

DISTRIBUTION

System voltage, kV	12.5/7.2*	12.5/7.2*	24.9/14.4**
Leakage, inches	7-1/2	10	15
Flashover, dry, kV	65	70	95
Flashover, wet, kV	<u>40</u>	<u>50</u>	<u>65</u>
<u>Chance</u>			
7" Stud	C903-1910-04	C903-1911-04	C903-1912-04
1-3/4" Stud	C903-1910-05	C903-1911-05	C903-1912-05
<u>Lapp</u>			
7" Stud	4415P	4420P	4427P
1-3/4" Stud	4315P	4320P	4327P
<u>Newell Porcelain</u>			
7" Stud		43400-7040	43401-7040
1-3/4" Stud		43400-7010	43401-7010
<u>Porcelain Products (Knox)</u>			
7" Stud	5115-6510	5120-6510	5127-6510
1-3/4" Stud	5115-6500	5120-6500	5127-6500

TRANSMISSION

System voltage, kV	22	34.5	46
ANSI Class	57-2	57-3	57-4
Flashover, dry, kV	110	125	150
Flashover, wet, kV	<u>85</u>	<u>100</u>	<u>125</u>
<u>Chance</u>			
7" Stud	C903-1002-04	C903-1003-04	
1-3/4" Stud	C903-1002-05	C903-1003-05	
<u>Lapp</u>			
7" Stud	9435	9445	9455
1-3/4" Stud	9335	9345	9355
<u>Newell Porcelain</u>			
7" Stud	37620-7040	41640-7040	41650-7040
1-3/4" Stud	37620-7010	41640-7010	41650-7010
<u>Porcelain Products (Knox)</u>			
7" Stud	5135-6512	5145-6512	
1-3/4" Stud	5135-6502	5145-6502	

NOTE: Post Insulators (item ea) may be substituted for the crossarm pin (Item f) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Bulletin 50-5 (Form 803) at the option of the owner.

*The transverse loading on these insulators shall not exceed the lower of 40 percent of the insulator's ultimate strength and the maximum transverse loading given for the structure in REA Bulletin 50-3 (Form 804).

**The transverse loading on these insulators shall not exceed 40% of the insulations' ultimate strength.

ea - Insulators, horizontal post type

<u>Manufacturer</u>	<u>34.5 kV</u>	<u>69 kV</u>	<u>115 kV</u>
Lapp	F-4745	F-4788	F-70147
Locke	-	LS02513	LS05013
Newell Porcelain	43740	43790	47043
Victor Insulators, Inc.	62356	-	-

ea - Insulator, post type

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Victor Insulators, Inc.</u>		
2120 (12.5/7.2 kV)	932	To obtain experience.
2127 (24.9/14.4 kV)	12/4/69	
62055 (22 kV)	1189	
62056 (34.5 kV)	6/19/80	

eb
July 1989

eb - Bracket, Pole Top
For Post type Insulators

DISTRIBUTION

<u>American Connector</u> (14.4 or 7.2 kV)	PTB-58
<u>Barron Bethea</u> (14.4 or 7.2 kV)	1B-4
<u>Continental</u> (14.4 or 7.2 kV)	PTB-55-8
<u>Cooper Power Systems (McGraw-Edison)</u> (14.4 or 7.2 kV)	DC62B1
<u>Flagg (MIF)</u> (14.4 or 7.2 kV)	P526
<u>Joslyn</u> (14.4 or 7.2 kV)	J23333
<u>Lapp (Line Ware)</u> (14.4 or 7.2 kV)	304043
<u>Power Line Hardware</u> (14.4 or 7.2 kV)	PTIB-375A
<u>Reliable/Bethea</u> (14.4 or 7.2 kV)	BPT-58F
<u>Universal Electric</u> (14.4 or 7.2 kV)	PT-8R

TRANSMISSION

Barron Bethea	1B-4
Reliable/Bethea	BPT-58HF
Continental	PTB-66H
Cooper Power Systems (McGraw-Edison)	DP29A1
Flagg (MIF)	P532
Lapp (Line Ware)	304044

NOTE: Pole top bracket (Item eb) and post insulator (Item ea) may be substituted for pole top pin (Item b) and pin insulator (Item a) for both small and large conductor distribution drawings shown in REA Form 803 at the option of the owner.

ec
July 1989

ec - Bracket, Offset Neutral

Chance C206-0004

Cooper Power Systems DC6N1
(McGraw-Edison)

Dixie D-2353

Joslyn J2352

ed
July 1989

ed - Support, overhead ground wire

Applicable Specifications: "REA Specifications for Overhead Ground
Wire Support Brackets," T-2

Pole top diameter, inches	6-8	8-10	10-12
Chance	-	5432	5433
Dixie	-	-	D7760
Hughes Brothers	-	2859-12	2859-14
Joslyn	J6393	J6394	J6395
Kortick	K3580	K3581	K3582
Utilities Service	C1238	C1239	C1240

ef - Bolt, clevis

Applicable Specifications: "REA Specifications for Clevis Bolts,"
DT-7

	<u>Dia.</u> <u>Inches</u>	<u>8"</u>	<u>10"</u>	<u>12"</u>	<u>14"</u>
Chance	5/8	15808	15810	15812	15814
	3/4	15828	15830	15832	15834
Joslyn	5/8	J7808	J7810	J7812	J7814
	3/4	J7828	J7830	J7832	J7834



eg
July 1989

eg - Plate, crossarm reinforcing

TRANSMISSION

For 5-5/8" x 7-3/8" crossarm

Manufacturer

Catalog Number

Chance

4047

Hughes Brothers

1113.88

Joslyn

J22672.6

Utilities Service

3838

eh
July 1989

eh - Hook, ball

<u>Manufacturer</u>	<u>Catalog Number</u>
Anderson Elec./Square D	HB-30
Continental Electric Co.	BH-30-5
Flagg	13400
Joslyn (Brewer-Titchener)	3001-HT
Lapp	7055
Lindsey	3310
Power Line Hardware	BH-30
Reliable/Bethea	BH-5

ei - Clamps, suspension with socket eye

ACSR with Straight or Formed Armor Rods

AWG		kcmil			
1/0 & 2/0	3/0	4/0	266.8	336.4	477
<u>Iron or Steel Clamps</u>					
MS-82-S	--	MS-104-S	--	--	--
FGW-4S	--	--	--	--	--
305743S	--	--	--	--	--
FS-83-S	--	--	--	--	--

Anderson
C & R
Continental
Dulmison
Lapp
*Preformed
Reliable/Bethea

ACSR with Straight or Formed Armor Rods

AWG		kcmil			
1/0 & 2/0	3/0 & 4/0	266.8	336.4	477	556.5
<u>Aluminum Alloy Clamp</u>					
HAS-85-S	HAS-104-S	HAS-104-S	HAS-118-S	HAS-139-S	HAS-147-S
CRSC-1S	CRSC-2S	CRSC-3S	CRSC-3S	--	--
SC-85-S	SC-105-S	SC-105-S	SC-119-S	SC-136-S	SC-149-S
--	HSU	HSU	HSU	HSU	HSU
306029S	306030S	306030S	306031S	306032S	--
--	AGS	AGS	AGS	AGS	AGS
LS-1-S	LS-2-S	LS-2-S	LS-3-S	LS-4-S	LS-6-S
					LS-7-S
					LS-8-S

Anderson
C & R
Continental
Dulmison
Lapp
*Preformed
Reliable/Bethea

*Clevis type available.

ej - Clamps, deadend with socket eye

ACSR

<u>AWG</u> <u>2/0 to 4/0</u>	<u>266.8</u>	<u>336.4</u>	<u>477</u>	<u>556.5</u>	<u>795</u>	<u>954</u>
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Iron or Steel Clamps (require armor tape or liner)

Aluminum Alloy Clamps (do not require armor tape or liner)

Anderson/Square D	SD-57-S	SD-70-S	SD-70-S	SD-86-S	SD-86-S	--
C & R	CR-10-60S	CR-20-60S	CR-20-60S	--	--	--
Lapp	305757S	305758S	305759S	305760S	--	--
Reliable/Bethea	ADE-21-S	ADE-22-S	ADE-23-S	ADE-24-S	ADE-24-S	ADE-2526-S ADE-2526-S

NOTE: When used with clevis-type insulators for large conductors on distribution lines, order clamp with clevis eye.

ek
July 1989

ek - Locknuts

For Bolt Diam., in.:	3/8	1/2	5/8	3/4	7/8
	<u>MF Type</u>				
Chance	3510	3511	3512	3513	3514
Cooper Power Systems (McGraw-Edison)	DF3N1	DF3N2	DF3N4	DF3N6	DF3N8
Dixie	D3510	D3511	D3512	D3513	--
Hughes Brothers	MF30	MF50	MF60	MF70	--
Joslyn	J8581	J8582	J8583	J8584	J8584-1/2
Kortick	K1065	K1066	K1067	K1068	--
Power Line Hardware	SLN38	SLN50	SLN58	SLN34	SLN78
Utilities Service	4920	4921	4922	4923	4924

e1
July 1989

e1 - Sectionalizer

Manufacturer

Cooper Power Systems
(McGraw-Edison(Kyle))

Type

GH (with crossarm mounting
bracket KA27G)

Conditional List
 el
 July 1989

el - Sectionalizer

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Cooper Power Systems (McGraw-Edison)</u>		
Sectionalizer, three-phase Type GN3	663 (3/12/59)	To obtain experience.
Sectionalizer with 125 kV BIL accessory Type GH, 15 kV, single phase	1046 (7/25/74)	1. To obtain experience. 2. For use on single- phase taps of 24.9/14.4 kV multi- grounded wye systems.
*Sectionalizer, three-phase Type GN3E 14.4 kV, 200 amp max.	1153 (12/21/78)	To obtain experience.
*Sectionalizer, three-phase Types GV and GVC 14.4 kV, 400 amp. max.	1153 (12/21/78)	To obtain experience.
*Sectionalizer, three-phase Types GW and GWC 34.5 kV, 400 amp. max.	1153 (12/21/78)	To obtain experience.
<u>General Electric</u>		
Sectionalizer, single-phase dry-type - 15 kV	910 (1/23/69)	1. To obtain experience.
Model 9F41D with load interrupter only	1159 (3/15/79)	2. Accepted ratings; 10 through 100 amperes at 15 kV max. line to ground voltage.
	1278 (4/12/84)	
<u>Joslyn</u>		
Sectionalizer, three-phase, 15 kV, 400 and 600 amperes 25 kV, 600 amperes	1042 (5/30/74)	To obtain experience.
Model VBM with VT or RS control	1358 (3/3/88)	To obtain experience.

*NOTE: Ratings greater than 100 ampere for 12.5/7.2 kV application and greater than 200 ampere for 24.9/14.4 kV application are acceptable only with ground trip device.

em
July 1989

em - Brace, crossarm, special
(angle alley arm)

DISTRIBUTION

15" span, 14" drop; 1-1/2" x 3/16"

Cooper Power Systems (McGraw-Edison)	DB4L1
Dixie	D17939
Joslyn	J1415
Kortick	K1978
Utilities Service	5514

TRANSMISSION

2'-6" span x 1'-8" drop
1-3/4" x 3/16"

3'-6" span x 2'-3" drop
1-3/4" x 3/16"

Chance	--	6999
Cooper Power Systems (McGraw-Edison)	DB4L3	DB4L4
Hughes Brothers	AS-2309-B	AS-2309-A
Joslyn	J1430	J1442
Kortick	K1975	K1976
Utilities Service	5509	5510

Conditional List
eq(1)
July 1989

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

METAL BRACKETS

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Single post insulator brackets	1049 9/5/74	1. To obtain experience.
C206-0209 for 12.5/7.2 kV construction only		2. For use only in scenic areas and locations where right-of-way is limited.
C206-0010 for 24.9/14.4 kV construction		
Deadend bracket assembly, C206-0179	1081 1/8/76	3. Not to be used where conductor galloping may be expected.
Deadend bracket assembly, C206-0211 for 24.9/14.4 kV construction		
<u>Continental</u>		
Standoff bracket IACB-18-5	1065 5/15/75	(Same as above)
<u>Flagg (MIF)</u>		
Single post insulator bracket, P542	1032 12/20/73	(Same as above)
Deadend bracket assembly, PAX188A		
Deadend bracket assembly, PAX188M for 24.9/14.4 kV construction	1044 6/27/74	
Standoff bracket, PA619B	1048 8/22/74 1335 2/5/87	
<u>Joslyn</u>		
Single post insulator brackets	1043 6/13/74	(Same as above)
24840.1, for 12.5/7.2 kV construction only		
24840.2, for 24.9/14.4 kV construction		

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

METAL BRACKETS

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Anderson/Sq. D Standoff bracket, COB-E-180-TGL	1180 (1/31/80)	1. To obtain experience 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected.
Dixie Deadend bracket assembly D21142 for 12.5/7.2 kV	1220 (10/8/81)	Same as above.
Deadend bracket assembly D21144 for 24.9/14.4 kV		
Reliable/Bethea Single post insulator bracket, HBF-10-9-GC	1156 (2/1/79)	Same as above.
Standoff bracket VIB3-18-GC	1213 (6/4/81) 1278 (4/12/84) 1371 (10/6/88)	
Universal Electric Single post insulator bracket, SAB-3-18-GC	1271 (12/15/83)	Same as above.
Western Power Products Single post insulator bracket, HDB-200-R, for 12.5/7.2 kV construction only.	1152 (12/7/78)	Same as above.

Conditional List
eq(2)
July 1989

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC

For 12.5/7.2 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Hughes Brothers</u>		
Two-phase angle bracket 761-36-8	1032 (12/20/73)	1. To obtain experience.
Two-phase pin bracket 813-36	1294 (2/14/85)	2. For use only in scenic areas and locations where right-of-way is limited.
Standoff insulator, 560-13		
Standoff insulator, 560-18		
Suspension bracket, 615-18		
Deadend arm, 540-36	1063(4/17/75)	3. Not to be used where conductor galloping may be expected.
Standoff bracket, 892-18	1089(4/29/76)	
		4. Not to be used in con- taminated atmospheres.
<u>Chance</u>		
Two-phase pin bracket C653-0638	1043(6/13/74)	Same as above
Standoff insulator C653-0621		
Deadend arm C653-1023	1049(9/5/74) 1141(6/15/78)	
<u>Continental</u>		
Two-phase pin bracket GPB2-568M-36V	1181(2/14/80)	Same as above.
Two-phase angle bracket GPB2-568M-36E		
Standoff insulator GPB-58M-13		
Standoff insulator GPB-58M-18		
Deadend arm GDEA-58-3.0-36-2E		
Suspension bracket GPB-58M-18E		

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC
For 12.5/7.2 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Reliable/Bethea</u>		
Two-phase pin bracket 6742-36P	1285 8/16/84	1. To obtain experience
Standoff insulator bracket 6745-13P	1371 10/6/88	2. For use only in scenic areas and locations where right-of-way is limited.
Standoff insulator bracket 6745-18P		3. Not to be used where conductor galloping may be expected.
		4. Not to be used in con- taminated atmospheres.
<u>Flagg (MIF)</u>		
Two phase angle bracket 7561-336E	1201 12/4/80	Same as above.
Two phase pin bracket 7561-436		
Standoff insulator 7561-012		
Standoff insulator 7561-018		
Suspension bracket 7561-818		
Standoff bracket 7561-218		
Deadend arm 7554-636-4E	1272 1/5/84	

Conditional List
eq(2.2)
July 1989

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC

For 24.9/14.4 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Chance</u>		
Two-phase pin bracket C653-0987	1049(9/5/74)	1. To obtain experience.
Standoff insulator C653-0988		2. For use only in scenic areas and locations where right-of-way is limited.
Deadend arm C653-1024	1041(6/15/78)	3. Not to be used where conductor galloping may be expected.
		4. Not to be used in con- taminated atmospheres.
<u>Continental</u>		
Two-phase pin bracket GPB2-568M-44--V-1.375	1181(2/14/80)	Same as above.
Two-phase pin bracket GPB2-558H-48-V-1.375	1272(1/5/84)	
Standoff insulator GPB-58M-19-V-1.375		
Standoff insulator GPB-58H-20-V-1.375		
Standoff bracket GIACB-58M-18		
Deadend arm GDEA-58-3.0-48-2E		
<u>Hughes Brothers</u>		
Deadend arm, 540-48	1063 (4/17/75)	Same as above.
Standoff insulator, 880-20	1081 (1/8/76)	
Two-phase pin bracket, 883-48	1089 (4/29/76)	
Standoff insulator, 870-19	1294 (2/14/85)	
Two-phase pin bracket, 862-44		
Standoff bracket, 892-18		

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

FIBERGLASS REINFORCED PLASTIC

For 24.9/14.4 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Reliable/Bethea</u>		
Standoff insulator bracket 6882-18P	1285 8/16/84	1. To obtain experience. 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected. 4. Not to be used in con- taminated atmospheres.
Standoff Insulator Bracket 6744-19P-1.375	1307 10/10/85	
Standoff insulator bracket 6748-20P-1.375	1371 10/6/88	
Two-phase pin bracket 6742-44P-1.375		
Two-phase pin bracket 6747-48P-1.375		
<u>Flagg (MIF)</u>		
Standoff insulator 7581-120X	1201 12/4/80	Same as above.
Standoff insulator 7561-118X		
Two-phase pin bracket 7561-448X	1272 1/5/84	
Standoff bracket 7561-218		
Deadend arm 7554-648-4E		

Conditional List
eq(3)
July 1989

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

WOOD ARM ASSEMBLIES

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Aluma-Form Arm assembly, 12.5/7.2 kV XA-3812 Arm assembly, 24.9/14.4 kV XA-4214	1038 (4/4/74)	1. To obtain experience. 2. For use only in scenic areas and locations where right-of-way is limited. 3. Not to be used where conductor galloping may be expected. 4. Not to be used as deadend structures.
Hughes Brothers Deadend arm, 2890-J complete with braces and attaching hardware, fittings and bolts	1065 (5/15/75)	1. To obtain experience. 2. For use only in scenic areas and locations right-of-way is limited. 3. Not to be used where conductor galloping may be expected.

eq - Narrow Profile Brackets and Special Arm Assemblies
(See REA Bulletin 61-12)

COMBINATION INSULATORS AND BRACKETS

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Salisbury Horizonatal Post 12.5/7.2 kV, 9561 24.9/14.5 kV, 9562	1305 (8/22/85)	<ol style="list-style-type: none">1. To obtain experience.2. For use only in scenic areas and locations where right-of-way is limited.3. Not to be used where conductor galloping may be expected.4. Not to be used in contaminated atmospheres.

er
July 1989

er - Wire Guard, Plastic

See Drawing M-24

Manufacturer

Type or
Catalog Number

Chance

PFG

Fargo

GM-936

Preformed Line Products (Tree Guard)

PTG

es - Splice Cover, Plastic

(For use over compression type service connections
in place of tape.)

<u>Manufacturer</u>	<u>Type</u>
Anderson/Square D	Type SEC
Blackburn	Type C
Kearney	Type 601
Plastic Engineering & Sales Co.	Wire Splice Cover
3M	PST Series 8420
Virginia Plastics	Type VP

Splice Cover and Moisture Seal for
Secondary Cable Connections (See
Drawings G312 and UM5)

<u>Manufacturer</u>	<u>Type</u>
AMP	Sealing & Dielectric Compound
Plymouth/Bishop	10 Plyseal
3M	Scotch Brand #2200

Bolted Connector Cover

(For use over bolted type service connections in place of tape.)

<u>Manufacturer</u>	<u>Type</u>
Fargo	GA-9000 B Series

eu
July 1989

eu - Extension Link
(Fiberglass)
(Distribution)

<u>Manufacturer</u>	<u>Strength</u>	<u>Catalog Number</u>
Anderson/Square D	10,000 lbs. 15,000 lbs.	*GSB1-9 GSB2-12
Barron Bethea	11,000 lbs. 15,000 lbs.	*BB-11-EE-12 BB-15-EE-12
Continental	11,000 lbs. 15,000 lbs.	*GEE11-12 GEE15-12
Flagg (MIF)	11,000 lbs. 15,000 lbs.	150-12EE 150-12EE
Reliable/Bethea	11,000 lbs. 15,000 lbs.	FGS16-EE-12P FGS16-EE-12P
Tranpol	11,000 lbs. 15,000 lbs.	*HSB-1-12 HSB-2X-12

*For use with 6" suspension insulators.

Conditional List
ex
July 1989

ex - Splice, formed type

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Preformed Line Products</u>		
Splice for ACSR	654 (10/16/58)	To obtain experience.
FTS full tension splice		
Splice for AWAC	999 (8/31/72)	For repair only.
LS-0185 for 4-4/3		
LS-0188 for 2-4/3		To obtain experience.
LS-0191 for 1/0-4/3		
		For repair only where alumoweld strands are not broken

fc-1
July 1989

fc - Capacitors, Shunt
12470/7200 Volts

<u>Manufacturer</u>	<u>Size</u>	<u>1 Bushing</u>	<u>2 Bushing</u>	<u>3 Bushing</u>
General Electric Film/Foil Type	25 kvar	52L226RC	52L206RC	
	50 kvar	51L226RC	51L206RC	
	100 kvar	54L226RC	54L206RC	
	150 kvar	54L526RC	54L506RC	
	200 kvar	58L126RC	58L106RC	
	300 kvar	59L226RC	59L206RC	59L611RC
Westinghouse	50 kvar	1N02050A09	1N02050A10	
	100 kvar	1N02100A09	1N02100A10	
	150 kvar	1N02150A09	1N02150A10	1N02150A07
	200 kvar	1N02200A09	1N02200A10	
	300 kvar			1N02303A07
	400 kvar			1N02403A07

fc - Capacitors, Shunt
24900/14400 Volts

<u>Manufacturer</u>	<u>Size</u>	<u>1 Bushing</u>	<u>2 Bushing</u>	<u>3 Bushing</u>
General Electric Film/Foil Type	50 kvar	51L252RC		
	100 kvar	54L252RC		
	150 kvar	54L552RC		
	200 kvar	58L154RC		
Westinghouse	50 kvar	1N02050A31		
	100 kvar	1N02100A31		
	150 kvar	1N02150A31		
	200 kvar	1N02200A31		
	300 kvar			1N02303A29
	400 kvar			1N02403A29

Conditional List
fc(1)
July 1989

fc - Capacitors, shunt
12470/7200 volts

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Cooper Power Systems (McGraw-Edison)</u>		
All film type, 1 bushing	1109 (3/3/77)	To obtain experience
CEP131B6 (100 kvar)	1186 (5/8/80)	
CEP132B6 (150 kvar)		
CEP140B6 (200 kvar)		
CEP160B6 (300 kvar)		
All film type, 2 bushing		
CEP131A6 (100 kvar)		
CEP132A6 (150 kvar)		
CEP140A6 (200 kvar)		
CEP160A6 (300 kvar)		
<u>Westinghouse</u>		
All-film type, 1 bushing	1211 (4/30/81)	To obtain experience
IN03050A09 (50 kvar)		
IN03100A09 (100 kvar)		
IN03150A09 (150 kvar)		
IN03200A09 (200 kvar)		
All-film type, 2 bushing		
IN03050A10 (50 kvar)		
IN03100A10 (100 kvar)		
IN03150A10 (150 kvar)		
IN03200A10 (200 kvar)		
All-film type, 3 bushing		
IN03303A07 (300 kvar)		
IN03403A07 (400 kvar)		

fc - Capacitors, shunt
24900/14400 volts

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Cooper Power Systems (McGraw-Edison)</u>		
All film type, 1 bushing	1109 (3/3/77)	To obtain experience
CEP138B4 (100 kvar)		
CEP137B4 (150 kvar)		
CEP142B4 (200 kvar)		
CEP162B4 (300 kvar)	1186 (5/8/80)	Same as above
<u>General Electric</u>		
Film/Foil Type, 1 bushing	1192 (8/7/80)	Same as above
51L252RC (50 kvar)		
54L252RC (100 kvar)		
54L552RC (150 kvar)		
58L154RC (200 kvar)		
<u>Westinghouse</u>		
All-film type, 1 bushing	1211 (4/30/81)	Same as above
1N03050A31 (50 kvar)		
1N03100A31 (100 kvar)		
1N03150A31 (150 kvar)		
1N03200A31 (200 kvar)		
All-film type, 3 bushing		
1N03303A29 (300 kvar)		
1N03403A29 (400 kvar)		

fd
July 1989

fd - Hangers, Capacitor

Crossarm Mounting

	<u>1 unit</u>	<u>2 units</u>	<u>3 or 4 units</u>
Cooper Power Systems (McGraw-Edison)	CH1A1	CH2A2	CH4A1
General Electric	39F41	39F53	39F54
Westinghouse	85B397G01	791C644G01	791C644G02

Pole Mounting

	<u>Single Phase</u>	<u>Three Phase</u>	
		<u>In Line</u>	<u>Cluster</u>
Aluma-Form	CR-3* thru CR-6*	CR-3/4*	3-CR-3/4*
General Electric	39F83G1	39F86G1	
Joslyn	J6744, J6744A		
Westinghouse	AL30R (3 units)	(1Ø units)	
	AL60R (6 units)	AL30R	(3 units)
		AL60R	(6 units)
		AL90R	(9 units)
		(3Ø units)	
		AL13W	(1 unit)
		AL23W	(2 units)
		AL33W	(3 units)
		AL43W	(4 units)
		AL53W	(5 units)

* Available with oil switch mounting bracket.

fg
July 1989

fg - Crossarm Saddle

(3-3/4" x 4" with 1-1/4" x 1/4" flange)

Manufacturer

Catalog Number

Lapp

10369

fi
July 1989

fi - Connectors, hot line

Over Armor Rods

<u>Manufacturer</u>	<u>Catalog Number or Series (Al to Al)</u>	<u>Catalog Number or Series (Al to Cu)</u>
Blackburn	PGH	-
Electrical Specialty	AHC-500	AHC-500 GP
Fargo	GA-100 Series	GA-100C Series

fj - Bracket, extension

(For use in mounting oil circuit reclosers or sectionalizers)

See Drawing VM3-10A

	<u>Through Bolt Type</u>	<u>Band Type</u>
Aluma-Form	TBRSM-1, TB2M1-9*	RSM-i
Cooper Power Systems (McGraw-Edison)	DR2E3	
Dixie	D-2359-M	
Joslyn	J2357	

*For mounting double lug reclosers.

fk - Bracket, oil circuit recloser or sectionalizer

(For cluster mounting of three oil circuit reclosers on pole)

Aluma-Form	RSM-3, 6M3-9*
*Cooper Power Systems (McGraw-Edison)	DT8C1
Turner	695-3

*Suitable for 14.4 and heavy duty 7.2 kV.

fl - Rack, primary metering

(For cluster mounting of primary metering equipment on pole)

Aluma-Form	PMM Series
Turner	3CT-PT

fm
July 1989

fm - Bracket, Arrester and Pothead Extension

For Distribution Arrester and Cutout - Pole Mounting

<u>Manufacturer</u>		<u>Single Phase</u>	<u>Three Phase</u>
Aluma-Form		1HCA-18 Series	R3CA-48
American Connector Engineering		EMB-3-18-GC	
Anderson/ Square D	12.5/7.2 kV 24.9/14.4 kV	COB-E-120-TGL COB-E-180-TGL	
Chance		C653-1038	C653-1056
Continental	12.5/7.2 kV 24.9/14.4	IACB-12-5LGE IACB-18-5LGE	GPB-3-0-568M-3012-CAT 12 GPB-3-0-568M-4017-CAT 12
Cooper Power Systems (McGraw-Edison)		DC34B3	
Dixie	12.5/7.2 kV 24.9/14.4 kV	D-1580 D-1583	D27211-G
Flagg (MIF)	12.5/7.2 kV 24.9/14.4 kV	PA613B PA619B	7510-730 7510-740-17
Hughes Brothers		892-18	670-40
Joslyn	12.5/7.2 kV 24.9/14.4 kV	J26190 J26191	
Power Line Hardware	12.5/7.2 kV	CA-12-3GL	
Reliable/ Bethea	12.5/7.2 kV 24.9/14.4 kV	VIB3-18-R1-GC-C VIB3-18-GC	
Universal Electric		SAB-3-18-GC	

For two distribution arresters in parallel or one
arrester and cutout - crossarm mounted

<u>Manufacturer</u>	<u>Catalog No.</u>
Cooper Power Systems (McGraw-Edison)	DM23B1

For Intermediate Arrester Mounting

<u>Manufacturer</u>		<u>Single Phase</u>	<u>Three Phase</u>
Aluma-Form		WBMA-1	R3CSA-48
Reliable/Bethea	12.5/7.2 kV	VIB3-18-R1-GC-C	

fn - Bracket, Cutout Extension

<u>Manufacturer</u>		<u>Catalog Number</u>
Aluma-Form		1HCA-C-18
American Connector Engineering		EMB-3-18-GC
Anderson Elec./ Square D	12.5/7.2 kV	COB-E-120-TGL
	24.9/14.4 kV	COB-E-180-TGL
Chance		C653-1038
Continental	12.5/7.2 kV	IACB-12-5-LGE
	24.9/14.4 kV	IACB-18-5-LGE
Cooper Power Systems (McGraw-Edison)		DC34B1
Flagg (MIF)	12.5/7.2 kV	PA613B
	24.9/14.4 kV	PA619B
Hughes Brothers		892-18
Power Line Hardware	12.5/7.2 kV	CA-12-3GL
Reliable/Bethea	12.5/7.2 kV	VIB3-12F-GC
	24.9/14.4 kV	VIB3-18-GC
Universal Electric		SAB-3-18-GC

fo
July 1989

fo - Bracket, Transformer Secondary, Insulated

<u>Manufacturer</u>	<u>Bracket Without Insulator</u>	<u>Bracket With 2-1/4" Diameter Spool Insulator</u>	<u>Bracket With 3-1/8" Diameter Spool Insulator</u>
Chance	-	9113S	9114S
Cooper Power Systems (McGraw-Edison)	DT4M1	DT4M13	DT4M11
Joslyn	-	J6765-A	J6765
Utilities Service	865	865/208	865/205

Conditional List

fq
July 1989

fq - Laminated Upswept Arms

Applicable Specification: REA Specification DT-5B
Applicable Drawing: REA Drawing TUS-1

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Hughes Brothers</u>		
Types:		
C-4080A (5-1/8" width)	1095 (8/11/76)	1. To obtain experience
C-4080B (5-1/8" width)		
C-4113A (3-1/8" width)	1113 (4/28/77)	2. For use only in
C-4113B (3-1/8" width)		scenic and urban
		areas where right-
		of-way is limited.

fr
July 1989

fr - Triplex Cable support Clamp
(See Drawing M24)

Manufacturer

Catalog Number

Flagg

PA392

fs - Pole Bearing Plate

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Flagg (MIF)</u> P325B	785 (2/20/64)	1. To obtain service and operating experience on cross-braced transmission structures. 2. For determining corrosion resistance. 3. For determining structure uplift capability of the pole under various soil and moisture conditions.
<u>Continental</u> PB-80-7	1114 (5/12/77)	(Same as above)
<u>Dixie</u> D-6370-GR	1210 (4/16/81)	(Same as above)
<u>Reliable/Bethea</u> PBP-156-7	1070 (7/24/75) 1278 (4/12/84) 1371 (10/6/88)	(Same as above)

fu
July 1989

fu - Swinging angle bracket and guying plate

(TRANSMISSION)

Manufacturer

Joslyn

Catalog Number

J22712.3 (Bracket and guy plate)
J22714 (plate only)

fv
July 1989

fv - Guying Attachments
Transmission

Manufacturer

Catalog Number

Pole Eye Plates

Continental

EPR-66S-12

Flagg (MIF)

PX37D

Reliable/Bethea

PE6-77A

Conditional List
fv(1)
July 1989

fv - Guy Attachments
Pole Bands with Through Bolts
for Transmission Lines

Strength Ratings: 25,000 lbs. ultimate loading
(45° guy angle)*

<u>Manufacturer</u>	<u>Pole Band With Through Bolts and Associated Hardware**</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Hughes	3108 C.x	1172 9/20/79	To obtain experience.
		1292 1/10/85	
Joslyn	J26043.xGL (includes fether drive lag screws and thru bolt)	1292 1/10/85	To obtain experience.

*For a 30° guy angle, capacity of pole bands should be derated.

**Appropriate connecting links (Item du(1)) should be ordered with the
pole band.

ga - Watthour and Watthour-Demand Meters
10, 2 and 3 wire or 2/3 wire 120/240 volts
(Classes 100, 200, 10, and 20)

<u>Self-Contained Types</u>					
1 Manufacturer	2 Type of Base	3 Watthour Meter Type	4 Mechanical Demand Watthour Type	5 Thermal Demand Watthour Type	6 Number of Terminals
General Electric	Bottom Con. Socket	I50A I70S	IM50A IM70S	- -	4 4
Landis & Gyr	Bottom Con. Socket	- MS	- BMS-2S	- TMS	- 4
Sangamo	Bottom Con. Socket	J5SA J5S*	J5DSA J5DS	- -	- 4
Westinghouse	Bottom Con. Socket	D2A D5S	D2AM D5SM	- D2SH	- 4
<u>Transformer Rated Types</u>					
General Electric	Bottom Con. Socket	I50A I70S	IM50A IM70S	- -	5 or 6 5 or 6
Landis & Gyr	Bottom Con. Socket	- MS	- BMS	- TMS	- 5 or 6
Sangamo	Bottom Con. Socket	J5SA J5S	J5DSA J5DS	- -	- 5 or 6
Westinghouse	Bottom Con. Socket	D2A D2S	D2AM D2SM	- -	- 5 or 6

* Type J4ES for Class 320

ga-2
July 1989

ga - Watthour and Watthour-Demand Meters
Polyphase 2 element - 3 wire, 240 volts - Delta and 120/208 Volts Network
(Classes 100, 200, 10, and 20)

Self-Contained Types

1 Manufacturer	2 Type of Base	3 Watthour Meter Type	4 Mechanical Demand Watthour Type	5 Thermal Demand Watthour Type	6 Number of Terminals
General Electric	Bottom Con. Socket	V62A V62S	VM62A VM62S	- -	5 -
Landis & Gyr	Bottom Con. Socket	- MT012S or 13S	- BMT-12S or 13S	- TMT-12S	- 5 or 8
Sangamo	Bottom Con. Socket	S2A S2S S12S	S2DA S2DS S12DS	- - -	5 or 8 - -
Westinghouse	Bottom Con. Socket	- D5S5	- D5S5M	- -	- -
<u>Transformer Rated Types</u>					
General Electric	Bottom Con. Socket	V63A V63S	VM63A VM63S	- -	8 -
Landis & Gyr	Bottom Con. Socket	MT-5A MT-5S	BMT-5A BMT-5S	TMT-5A TMT-5S	8 8
Sangamo	Bottom Con. Socket	S3A S3S	S3DA S4DS	- -	- 8
Westinghouse	Bottom Con. Socket	D5A-2 D5S-2	D5A2M D5S2M	- D4S-2H	- 8

ga - Watthour and Watthour-Demand Meters
Polyphase 2 element - 4 wire Delta - 120/240 volts
(Classes 100 or 200)

Self-Contained Types	1	Type of Base	2	Watthour Meter Type	3	Mechanical Demand Watthour Type	4	Thermal Demand Watthour Type	5	Number of Terminals	6
General Electric		Bottom Con. Socket		VM66A VM66S		VM66A VM66S		- -		7 -	
Landis & Gyr		Bottom Con. Socket		- MT-15S		- BMT-15S		- TMT-15S		- 7	
Sangamo		Bottom Con. Socket		S6A S6S		S6DA S6DS		- -		- 7 or 8	
Westinghouse		Bottom Con. Socket		D5A7 D5S7		D5A7M D5S7M		- -		7 or 8 -	

Transformer Rated Types

General Electric

Landis & Gyr

Sangamo

Westinghouse

Not shown in REA Bulletin 161-12

ga - Watthour and Watthour-Demand Meters
Polyphase - 2-1/2 element - 4 wire wye - (120/208) (277/480) volt
(Classes 100, 200, 10, and 20)

<u>Self-Contained Types</u>					
1 Manufacturer	2 Type of Base	3 Watthour Meter Type	4 Mechanical Demand Watthour Type	5 Thermal Demand Watthour Type	6 Number of Terminals
General Electric	Bottom Con. Socket	V65A V65S	VM65A VM65S	- -	7 -
Landis & Gyr	Bottom Con. Socket	- MT-14S	- BMT-14S	- TMT-14S	- 7
Sangamo	Bottom Con. Socket	S5A S5S	S5DA S5DS	- -	- 7 or 8
Westinghouse	Bottom Con. Socket	D5A8 D5S8	- D5S5M	- -	- -
<u>Transformer Rated Types</u>					
General Electric	Bottom Con. Socket	V65A V65S	VM65A VM65S	- -	7 or 13 -
Landis & Gyr	Bottom Con. Socket	MT-6A MT-7S or 6S	BMT-6A BMT-7S or 6S	TMT-6A TMT-7S or 6S	10 7 or 13
Sangamo	Bottom Con. Socket	S5A S5S	S5DA S5DS	- -	- 13
Westinghouse	Bottom Con. Socket	D5A8 D5S8	D5A8M D5S8M	- D4S8H	- 13

ga - Watthour and watthour-Demand Meters

Polylphase - 3 element - 4 wire wye - (120/208) (277/480) volt
(Classes 100, 200, 10, and 20)

<u>Self-Contained Types</u>					
1 Manufacturer	2 Type of Base	3 Watthour Meter Type	4 Mechanical Demand Watthour Type	5 Thermal Demand Watthour Type	6 Number of Terminals
General Electric	Bottom Con. Socket	V64A V64S	VM64A VM64S	- -	- 7 or 8
Landis & Gyr	Bottom Con. Socket	MT-16S	BMT-16S	-	- 7
Sangamo	Bottom Con. Socket	S4A S4S	S4DA S4DS	-	- 7 or 8
Westinghouse	Bottom Con. Socket	D5-A3 D5-S3	D5A3M D5S3M	-	- 7 or 8
<u>Transformer Rated Types</u>					
General Electric	Bottom Con. Socket	V64A V64S	VM64A VM64S	- -	- 13
Landis & Gyr	Bottom Con. Socket	MT-9A MT-9S or 10S	BMT-9A BMT-9S or 10S	- -	12 13
Sangamo	Bottom Con. Socket	S4A S4S	S4DA S4DS	- -	- 13

Conditional List
ga(1)
July 1989

ga - Watthour and Watthour-Demand Meters

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Landis & Gyr		
Special base, 3 wire, 1Ø watthour meter, Type MS-K, Class 400 watthour and mechanical demand Type BMS-K watthour and thermal demand Type TMS-2K	947 (7/9/70) 1113 (4/28/77)	1. To obtain experience 2. To be used only where Class 400 meters are permitted by local regulatory bodies.
Socket base, 3 wire, 1Ø watthour meter, Type MS-E, Class 300	1113 (4/28/77)	1. To obtain experience 2. To be used only where Class 300 meters are permitted by local regulatory bodies.

gb - Meter Sockets

Type or Catalog Number

Manufacturer	Ring	Ringless	No. Jaws	Rating Amps.
Anchor#	1000 Series (1003-1006) 1100 Series (1100-1109) 1200 Series (1201-1209)	1000 Series (1003-1006) 1100 Series (1100-1109) 1200 Series (1201-1209) 1200/1300 Series (1275-1300)	4, 5 4, 5, 7 4, 5 4, 5, 7	100 150 200 200
	1600 Series (1600-1661) 1500 Series (1500-1526) 1500 Series (1530-1536) 1500 Series (1540-1546) 1400 Series (1405-1473)	1600 Series (1600-1661) 1500 Series (1500-1526) 1500 Series (1530-1536) 1500 Series (1540-1546) 1400 Series (1405-1473)	4, 5 4, 5 4, 5 4, 5 4, 5, 6, 7, 8, 13	320 100/125 per sta. 150 per sta. 200 per sta. 20/100
Crouse-Hinds (Arrow-Hart/ Murray)	SJ Series* (Single) SD Series* (Mult.) SN Series* (Single) SS Series* (Single)	RJ Series* (Single) RD Series* (Mult.) RN Series* (Single) RS Series* (Single) RH Series* (Single)	4, 5, 6 4, 5, 6 4, 5, 6 4, 5, 6 5, 7	100 125 per sta. 100 200 200 HD

#Available with UL label
*UL label

gb - Meter Sockets

<u>Manufacturer</u>	<u>Ring</u>	<u>Type or Catalog Number</u>	<u>Ringless</u>	<u>No. Jaws</u>	<u>Rating, Amps.</u>
Durham			CQ-U# HQ-U# 7000 Series# 71000 Series# 81000 Series#	4, 5, 7 4, 5, 7 4 or 5 4 or 5 4 or 5	200 200 100 200 200
Dyna-Tech			1000-C - 1007-C 1200-C - 1207-C 2000-CH-2007-CH 2200-CH-2207-CH	4 & 5 4 & 5 4 & 5 4 & 5	100 100 200 200
			2590-CHU-2597-CHU 2790-CHU-2797-CHU 2090-CHU-2097-CHU 2290-CHU-2297-CHU	4 & 5 4 & 5 4 & 5 4 & 5	200 200 200 200
General Electric	R-2# S-1#		SI-73# SI-73# for SV-60# SI-60# SI-60	4, 5, 6 4, 5, 6 4, 5, 6 4, 5, 6 7, 8, 13 4, 5, 6 5, 6	100 100 200 200 100-200, 20 100 20
General Switch					
Landis & Gyr		42100 Series*	RS# CQ# HQ# HQ-T	4, 5, 6 4, 5, 6 4, 5, 7 4, 5, 7 6, 7, 8, 13	100 100, 200 200 200 HD 20

*UL Label
#Available with UL label

gb - Meter Sockets

<u>Manufacturer</u>	<u>Ring</u>	<u>Type or Catalog Number</u>	<u>Ringless</u>	<u>No. Jaws</u>	<u>Rating, Amps.</u>
Milbank					
			<u>Overhead</u>		
		S7486 Series,	S7462, 3,4,5,6	4 or 5	100
		S7262 Series,	U7362*, 3,4,5,6	4 or 5	100
		S7021 Series,	R7486 Series*	4 or 5	150
		S9550 Series,	U7262 Series*	4 or 5	200
		S9700 Series,	U7021 Series*	4 or 5	200 (HD)
			U9550 Series*	4 or 5	200 (HD)
			U9700 Series*	7	200 (HD)
Nix & Miller					
			<u>Underground</u>		
		S8086-XL,	U8086-XL*	4 or 5	100
		S8084-XL,	U8084-XL*	4 or 5	150
		S7040-XL,	U7040-XL*	4 or 5	200
		S9551-XL,	U9551-XL*	4 or 5	200 (HD)
		S9701-XL,	U9701-XL*	7	200 (HD)
# Available with UL label					
			<u>Ringless</u>	<u>No. Jaws</u>	<u>Rating Amps</u>
			WV-100 Series	4, 5, 6	100
			WVL-100 Series #	4, 5, 6	100
			WVL-150 Series #	4, 5, 6	150
			WVEL-200 Series #	4, 5, 6	200
			WVHQ 45-200 Series #	4, 5	200 HD
			WVHQ 78-200 Series #	7	
Osborn					
			ORA-3 Series	4, 5 (overhead)	150
			ORA-4 Series	4, 5 (overhead)	200
			URA-4 Series	4, 5 (underground)	150
*UL label			URA-5 Series	4, 5 (underground)	200

Manufacturer	gb - Meter Sockets		No. Jaws	Rating, Amps.
	Ring	Type or Catalog Number		
Superior		<u>Overhead</u>		
	8048	501	4, 5	100
	314*	414*	4, 5	100
	314*	414*	4, 5	150
		452 Series	4, 5	200
	382 Series	482 Series*	4, 5	150 per sta. 200 per sta. 200 3Ø 4w Y or Delta per sta. 200 3Ø 4w Y or Delta 600 V
Superior		<u>Underground</u>		
		RLK Series*	5, 7	200 3Ø 4w Y or Delta 600 V
	314*	414*	4, 5	100
		414	4, 5	150
		"RLPK" Series	5, 7	200 3Ø 4w Y or Delta 600 V
		BRL 1915	4, 5	150 per sta.
Westinghouse	#S		4, 5, 6	100
	STS		5, 6	200/400** 1Ø 3w
	STS-2		8	200/400** 3Ø 3w
	STS-3		13	200/400** 3Ø 4w Y or Delta
	STS-7		8	200/400** 3Ø 4w Delta
	STS-8		8 or 13	200/400** 3Ø 4w Y or Delta
		STA-2		200/400 3Ø 3w
		STA-3		200/400 3Ø 4w Y
		STA-7		200/400 3Ø 4w Delta
		STA		200/400 1Ø 3w

#Available with UL label

* UL label

** Transformer rating in first figure; maximum loading shown by second figure

gb - Meter sockets

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Durham</u> M-400 ampere 4 or 5 jaws for use with Class 10 meters	1086 (3/18/76)	1. To obtain experience.
<u>Landis & Gyr</u> Meter mounting device 400 ampere, Type K-4# for use with Type MS-K, 1Ø Duncan meters	947 (7/9/70) 1136 (4/6/78)	1. To obtain experience. 2. To be used only where Class 400 meters are permitted by local regulatory bodies.
Socket type HQ-4S 4 jaws rated for Class 300 service	1136 (4/6/78)	1. To obtain experience. 2. To be used only where Class 300 meters are permitted by local regulatory bodies.
<u>Milbank</u> Type SI079-F, 4 jaws rated for Class 320 service	1103 (12/2/76)	1. To obtain experience.

#Available with UL label.

gj
July 1989

gj - Crossarm Assemblies and Arm Spacers

Distribution

Wood crossarm assembly complete with braces
and attaching hardware, fittings and bolts

Crossarm Assembly

<u>Manufacturer</u>	<u>Crossarm Size</u> (inches)	<u>Catalog No.</u>
Brooks	3-3/4 x 4-3/4 x 8'-0"	3102 F2
	3-3/4 x 5-3/4 x 8'-0"	3102 B2
	3-3/4 x 7-3/4 x 8'-0"	3102 I2
	3-3/4 x 7-3/4 x 10'-0"	3102 J2
Cascadian	3-1/2 x 4-1/2 x 8'-0"	C500B
	3-3/4 x 5-3/4 x 8'-0"	C500F
	3-3/4 x 7-3/4 x 8'-0"	C500M
Hughes Brothers	3-1/2 x 4-1/2 x 8'-0"	2890A
	3-3/4 x 5-3/4 x 8'-0"	2890B
	3-3/4 x 7-3/4 x 8'-0"	2892-A
	3-3/4 x 7-3/4 x 10'-0"	2892-B

Twin Arm Spacer*

To be used with standard hardware, 8' x 3-5/8" x 4-5/8" crossarm and 28" wood
braces

Flagg	PX240
Power Line Hardware	CAS-455

*Restricted to applications where the conductor's maximum design tension is
less than 1250 lbs. and to conductor sizes 1/0 ACSR and below.

gw-1
July 1989

gw - Crossarm Assembly for H-Frame Construction

Applicable Specification: REA Specification T-7, Revision dated
November 1962
Applicable Drawing : TH-11B Series (161 kV maximum)
No braces (TH-11B)
Two vee braces on outside (TH-11BVO)
Two vee braces on inside (TH-11BVI)
Four vee braces (TH-11BV4)

3-5/8" x 9-3/8" x 33' wood crossarm assembly complete
with attaching hardware, fittings, bolts and 3-3/8" x
5-3/8" braces.

Catalog Nos. or Drawing Nos.

	<u>TH-11B</u>	<u>TH-11BVO</u>	<u>TH-11BVI</u>	<u>TH-11BV4</u>
(Assemblies)	<u>Items</u> gw	<u>Items</u> gw and vo	<u>Items</u> gw and vi	<u>Items</u> gw and vv
American Crossarm and Conduit Co.(1)	70250	7025V0	7025VI	7025V4
Brooks (1,2)	6411	6411-1	6411-2	6411-3
Cascadian (1,2)	CCC11B72	CCC11B72-VO	CCC11B72-VI	CCC11B72-V4
Hughes Bros.(1,2)	C3316-B	C3316-B	C3316-B	C3316-B

- 1 - Fixed spacer fitting sizes as required
2 - Adjustable spacers are available

gw-2
July 1989

gw - Crossarm Assembly for H-Frame construction
(Double Arm) 230 kV (Small Angle)

Applicable Specification: REA Specification T-8
Drawing : TH-231B

Assembly complete with attaching hardware, fittings, bolts and braces.

<u>Manufacturer</u>	<u>Crossarm 3-5/8" x 9-3/8"</u>	<u>Catalog Number</u>
American Crossarm & Conduit (1)		8026VB
Brooks (1, 2)		64231
Cascadian (1, 2)		CCC231B82
Hughes Brothers (1, 2)		C-3338-B

	<u>Crossarm 5-1/8" x 7-1/2"</u>	
Brooks (1, 2)		64231L
Cascadian (1, 2)		CCC231BT
Hughes (1, 2)		C-3338-BL

- 1 - Fixed spacer fitting sizes as required.
2 - Adjustable spacers are available.

Conditional List
gw(1)
July 1989

gw - Crossarm Assembly for H-Frame Construction

Applicable Specification: REA Specification T-7

Applicable Drawing: Drawing TH-11B Series (161 kV maximum)

Condition: These adjustable spacers are not interchangeable with fixed spacers, and are only for use where the Borrower has determined that interchangeability with fixed spacers or standard adjustable spacers will not be required in the future.

	<u>Catalog Numbers or Drawing Numbers</u>			
	<u>TH-11B</u>	<u>TH-11BVO</u>	<u>TH-11BVI</u>	<u>TH-11BV4</u>
American Crossarm & Conduit	70250	7025V0	7025VI	7025V4

Conditional List
gw(2)

gw - Crossarm Assembly for H-Frame Construction
(Double Arm) 230 kV (Small Angle)

Applicable Specification: REA Specification T-8

Applicable Drawing: Drawing TH-231B

Condition: These adjustable spacers are not interchangeable with fixed spacers, and are only for use where the Borrower has determined that interchangeability with fixed spacers or standard adjustable spacers will not be required in the future.

	<u>Catalog Numbers or Drawing Numbers</u>
	<u>Crossarm 3-5/8" x 9-3/8"</u>
American Crossarm & Conduit	8026VB

gx-1
July 1989

gx - Single Pole Steel Structures with Arms

Applicable Specification: REA Specification for Single Pole Steel
Structures Complete with Arms, T-9

Manufacturer

Anchor Metals

FL Meyer Industries

Muskogee Iron Works

Power Enterprises, Inc.

Union Metal

Valmont Industries, Inc.

gy - Crossarm Assembly for H-Frame Construction
(Double Arm)

Applicable Specification: REA Specification T-7, Revision dated
November 29, 1962

Applicable Drawing: TH-10 Series
No braces (TH-10)
Two vee braces on outside (TH-10VO)
Two vee braces on inside (TH-10VI)
Four vee braces (TH-10V4)

3-5/8" x 9-3/8" x 32' wood crossarm assembly complete with
attaching hardware, fittings, bolts and 3-3/8" x 5-3/8"
braces.

Catalog Nos. or Drawing Nos.

	<u>TH-10</u>	<u>TH-10VO</u>	<u>TH-10VI</u>	<u>TH-10V4</u>
	<u>Items</u>	<u>Items</u>	<u>Items</u>	<u>Items</u>
(Assemblies)	gy	gy and vo	gy and vi	gy and vv
American Crossarm & Conduit Co.(1)	70208	70228	702281	70248
Brooks (1,2)	6410	6410-1	6410-2	6410-3
Cascadian (1,2)	CCC1071	CCC1071-VO	CCC1071-VI	CCC1071-V4
Hughes Bros. (1,2)	C-3316-A	C3316-A	C-3316-A	C-3316-A
Niedermeyer- Martin (1)	N-6710	N-6711	N-6712	N-6713

1 - Fixed spacer fitting sizes as required

2 - Adjustable spacers are available

gy-2
July 1989

gy - Crossarm Assembly for H-Frame Construction
(Double Arm) 230 kV (Tangent)

Applicable Specification: REA Specification T-8

Applicable Drawing: TH-230

Assembly complete with attaching hardware, fittings, bolts and braces.

Crossarm 3-5/8" x 9-3/8"

<u>Manufacturer</u>	<u>Catalog No.</u>
American Crossarm & Conduit (1)	8025V4
Brooks (1, 2)	64230
Cascadian (1, 2)	CCC23081
Hughes (1, 2)	C-3338-A
Niedermeyer-Martin (1)	N-6720

Crossarm 5-1/8" x 7-1/2"

Brooks (1, 2)	64230L
Cascadian (1, 2)	CCC230T
Hughes (1, 2)	C-3338-AL

1 - Fixed spacer fitting sizes as required.

2 - Adjustable spacers are available.

gy - Crossarm Assembly for H-Frame Construction
(Double Arm)

Applicable Specification: REA Specification T-7

Applicable Drawing: Drawing TH-10 Series

Condition: These adjustable spacers are not interchangeable with fixed spacers, and are only for use where the Borrower has determined that interchangeability with fixed spacers or standard adjustable spacers will not be required in the future.

	<u>Catalog Numbers or Drawing Numbers</u>			
	<u>TH-10</u>	<u>TH-10V0</u>	<u>TH-10VI</u>	<u>TH-10V4</u>
American Crossarm & Conduit	70208	70228	70228I	70248

Conditional List
gy(2)
July 1989

gy - Crossarm Assembly for H-Frame Construction
(Double Arm)

Applicable Specification: REA Specification T-8

Applicable Drawing: Drawing TH-230

Condition: These adjustable spacers are not interchangeable with fixed spacers, and are only for use where the Borrower has determined that interchangeability with fixed spacers or standard adjustable spacers will not be required in the future.

Crossarm 3-5/8" x 9-3/8"
Catalog Number

American Crossarm &
Conduit

8025V4

gz - Crossarm Assembly for Wishbone Construction "Z" Type
(Single Arm)

Applicable Specification: REA Specification T-5

Applicable Drawings: REA Drawings TSZ-1 and TMZ-1

3-5/8' x 5-5/8" wood crossarm assembly complete with
brace and attaching hardware, fittings, and bolts

The following manufacturers have shown compliance with the applicable
specifications for this assembly:

<u>Manufacturer</u>	<u>Catalog Nos. or Drawing Nos.</u>
American Crossarm & Conduit Co.	601TSZ and 602TSZ
Brooks	64Z1
Hughes Brothers	C-3162-A and C-3162.10

gz-2
July 1989

gz - Crossarm Assembly for Wishbone Construction, "Z" Type
(Double Arm)

Applicable Specification: REA Specification T-5

Applicable Drawings: REA Drawings TSZ-2, and TMZ-2

3-5/8" x 5-5/8" wood crossarm assembly complete with
brace and attaching hardware, fittings and bolts

The following manufacturers have shown compliance with the applicable
specifications for this assembly:

<u>Manufacturer</u>	<u>Catalog Nos. or Drawing Nos.</u>
American Crossarm & Conduit Co.	602TSZ
Brooks (2)	64Z2
Hughes Brothers	C-3162-B and C-3162.10

(2) Adjustable spacers are available.

sb - Switch, disconnect (single-pole, hook operated station class)

NEMA standard switches for station or line
structure use where single-pole switching is permissible

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Ratings</u>	<u>System Voltages Line to Line</u>
ABB	HPL	15 thru 69 kV	12.5 thru 69 kV
Bridges	EH	15 thru 69 kV	12.5 thru 69 kV
	EHL(L)	15 thru 34.5 kV	12.5 thru 34.5 kV
Cooper Power Systems (McGraw-Edison)	D2(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
G & W Electric	B-2M	15 thru 69 kV	12.5 thru 69 kV
	EV(PL)	15 thru 34.5 kV	12.5 thru 34.5 kV
Hi-Voltage (Joslyn)	HU	15 thru 34.5 kV	12.5 thru 34.5 kV
	HI	15 thru 34.5 kV	12.5 thru 34.5 kV
Johnson	HPT	15 thru 69 kV	12.5 thru 69 kV
Kearney	M-72(PL)	15 thru 69 kV	12.5 thru 69 kV
	H-72	15 thru 34.5 kV	12.5 thru 34.5 kV
MEMCO	STV	15 thru 69 kV	12.5 thru 69 kV
	STU	15 thru 69 kV	12.5 thru 69 kV
Morgan	DHS(PL)	15 thru 69 kV	12.5 thru 69 kV
Royal Switchgear	BT	15 thru 69 kV	12.5 thru 69 kV
	BLT(PL)	15 and 23 kV	12.5 thru 24.9 kV
S & C	LBD(PL)	15 thru 34.5 kV	12.5 thru 34.5 kV
	Alduti (L)	15 and 25 kV	12.5 thru 24.9 kV
Seeco	BT	34.5 thru 69 kV	34.5 thru 69 kV
Siemens-Allis	HA	15 thru 69 kV	12.5 thru 69 kV
	HS(PL)	15 and 25 kV	12.5 thru 24.9 kV

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available for voltages 34.5 kV and below. Consult switch manufacturer concerning loop switching applications at higher voltages.

sb-2
July 1989

sb - Switch, disconnect (single-pole, hook-operated station class)

NEMA standard switches for station or line
structure use where single-pole switching is permissible

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Ratings</u>	<u>System Voltages Line-to-Line</u>
Southern States	PBO	15 thru 69 kV	12.5 thru 69 kV
	*PBN	15 thru 23 kV	12.5, 13.2, 24.9 kV
USCO	HH(PL)	15 thru 69 kV	12.5 thru 69 kV

(L) Means solid material load interrupters are available and accepted.

(LV) Means vacuum interrupters are available and accepted.

* With steel base only.

(PL) Means hooks for portable load interrupters are available for voltages 34.5 kV and below. Consult switch manufacturer concerning loop switching applications at higher voltages.

sb - Switch, disconnect (single-pole, hook operated
distribution class)*

For distribution line use where power class insulation is not required and
single-phase switching is permissible.

(Not suitable for substation use)

<u>Manufacturer</u>	<u>Type</u>	<u>Voltage Rating</u>	<u>System Voltage Line-to-Line</u>
Chance	M3(PL)	15 and 27 kV	12.5 thru 24.9 kV
Cooper Power Systems (McGraw-Edison)	D2(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
G & W Electric Company	EV(PL)	15 kV	12.5 kV
Kearney	D-73(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Morgan	DHS(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
Royal Switchgear	BXT-F(PL)	15 and 23 kV	12.5, 13.2, 24.9 kV
S & C	LBD(PL)	15 and 25 kV	12.5, 13.2, 24.9 kV
Siemens-Allis	HD(PL)	15 and 25 kV	12.5 thru 24.9 kV

NOTE: Switches on this page must be furnished with four bolts for double
crossarm mounting.

(L) Means solid material load interrupters are available and accepted.

(PL) Means hooks for portable load interrupters are available.

(LV) Means vacuum interrupters are available and accepted.

*Steel bases only.

Conditional List
sb(1)
July 1989

sb - Switch, hookstick
(line tension switches)

for use on 12.5/7.2 kV systems only

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Bridges</u> 125	1279 (5/3/84)	To obtain experience.
<u>Chance</u> LTD06150-H	1279 (5/3/84)	To obtain experience.
<u>Royal Switchgear</u> IL6B-H	1332 (12/4/86) 1365 (6/23/88)	To obtain experience.

NOTE: All switches listed on this page have hooks for portable load interrupters.

sc - Regulators, Voltage
12.5/7.2 kV
13.2/7.62 kV

Applicable Specification: REA "Specification for Substation Regulators,"
S-2.

<u>Type</u>	<u>Size</u>	<u>Description</u>
<u>Cooper Power Systems</u> (McGraw-Edison)		
VR-32 AB	19.1 - 833 kVA 50 amp.	(SL) Single phase - step type (L) Single-phase - step type (Auto-Booster)
<u>General Electric</u>		
VR-1 MLT VML-32 VMLT-32	38.1 - 509 kVA 500 - 1000 kVA 500 - 833 kVA 1200 - 2800 kVA	(SL) Single-phase - step type (S) Three-phase - step type (S) Single-phase - Vacuum step type (S) Three-phase - vacuum step type
<u>Siemens-Allis</u>		
JFR	38.1 - 667 kVA	(SL) Single-phase - step type
<u>Westinghouse</u>		
UTS, UTT	167-1000 kVA	(S) Three phase step type

(L) Indicates line use
(S) Indicates substation use

sc-2
July 1989

sc - Regulators, Voltage
24.9/14.4 kV

<u>Type</u>	<u>Size</u>	<u>Description</u>
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Cooper Power Systems
(McGraw-Edison)

VR-32	72 - 833 kVA	(SL) Single phase - step type
AB	50 amp.	(L) Single phase - step type (Auto-Booster)

General Electric

VR-1	72 - 576 kVA	(SL) Single phase - step type
VML-32	500 - 833 kVA	(S) Single phase - vacuum step type
VMLT-32	1200 - 4666 kVA	(S) Three phase - vacuum step type

Siemens-Allis

JFR	72 - 833	(SL) Single phase - step type
-----	----------	-------------------------------

(L) Indicates line use
(S) Indicates substation use

Conditional List

SC
July 1989

sc - Regulators, Voltage

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>General Electric</u> Three-phase, step-type substation regulator Type TMLT-32 (13.2/7.62 kV)	723 (9/28/61)	To obtain experience.
<u>Siemens-Allis</u> Three-phase, step-type substation regulator Type SFR (13.2/7.62 kV)	657 (11/24/58)	To obtain experience.

sd
July 1989

sd - Current Transformers
Outdoor Type

<u>Manufacturer</u>	<u>.6 kV</u>	<u>15 kV</u>	<u>25 kV</u>	<u>34.5 kV</u>	<u>69 kV</u>
Andover	DCBW DCCW DCAB				
Associated Engineering	GT HA WEO	BB-15 LG-15	BB-25 LG-25 COF	LG-34.5 COF	COF-350
Astra	AA TFW AB AD				
Electromagnetic Industries (Square D)		C03-110	C03-150	C03-200	1K-350
General Electric	JCR-0 JCW-0 JAK-0 JAD-0	JKW-5 JCK-5	JKW-6 JKW-150 KG-150	JKW-7 JKW-200 KG-200	JKW-350 KG-350
Sangamo	R6S R6SA R6M R6L				
Westinghouse	CSF/CMS CMF CLC/CLE	KOR-11 KON-11 KOT-11	ICT-150 KOR-15 KOT-15	ICT-200 KOR-20	ICT-350

NOTE: The transformer types listed above are accepted in all standard ratios. Insulation class, voltages, ratios and other necessary information should be specified when ordering.

Conditional List
sd
July 1989

sd - Current Transformers
Outdoor Types

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Balteau Standard</u>		
Type KEWO-110, 15 kV	1212 (5/21/81)	To obtain experience.
Type KEWO-150, 25 kV		
Type KEWO-200, 34.5 kV		
Type KEWO-350, 69 kV		
<u>Electromagnetic Ind. (Square D)</u>		
Type UMCT, 0.6 kV	971(7/15/71)	To obtain experience.
Type UCT, 0.6 kV		
Type IK 4-350-69, 69 kV (cycloaliphatic resin bushings)	1325 (8/14/86)	

se
July 1989

se - Voltage Transformers

<u>Manufacturer</u>	<u>Outdoor Types</u>				
	<u>.6 kV</u>	<u>15 kV</u>	<u>25 kV</u>	<u>34.5 kV</u>	<u>69 kV</u>
Andover	DVE-6 DVF-6				
Associated Engineering	CL TL	PTT-150 SPOF-100 PTT-110	PTT-150 SPOF-150	POF-200	POF-350
Electromagnetic Industries (Square D)		PO5-110	PO5-150	PO5-200	U3-350-69
General Electric	JVA-0 JVP-0	JVW-5 JVW-110	JVW-6 ET-150 JVT-150	JVW-7 ET-200 JVT-200	ET-350 JVT-350
Sangamo	T5R T6R T7R				
Westinghouse	PPM	VOG-11 VOY-11 VOZ-11	LPT-150 VOG-15 VOZ-15	LPT-200 VOG-20 VOZ-20	LPT-350

NOTE: The transformer types listed above are acceptable in all standard ratios. Insulation class, voltages, ratios and other necessary information should be specified when ordering.

Conditional List
se
July 1989

se - Voltage Transformers

Outdoor Types

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Astra</u>		
Type DB, 0.6 kV	1087 (4/1/76)	To obtain experience.
Type DA, 0.6 kV		
Type DF, 0.6 kV	1261 (6/23/83)	
 <u>Balteau Standard</u>		
VE02-110, 15 kV	1212 (5/21/81)	To obtain experience.
VE05-110, 15 kV		
 <u>Electromagnetic Industries (Square D)</u>		
Type U-450, 0.6 kV	1080 (12/23/75)	To obtain experience.
Type U-4-350-69, 69 kV	1325 (8/14/86)	
(cycloaliphatic resin bushings)		

sj
July 1989

sj - Switches, oil circuit recloser by-pass

<u>Manufacturer</u>	<u>15 kV For use on 12.5/7.2 kV systems</u>	<u>27 kV For use on 24.9/14.4 kV systems</u>	<u>27 kV* For use on 34.5/19.9 kV systems</u>	<u>Current Rating Amperes</u>
Cooper Power Systems (McGraw-Edison)	FW77D7	FW77D9	FW77D9	600
Kearney	D73RB	D73RB		600

*Not For Use In Substations

sk
July 1989

sk - Switch, regulator by-pass - disconnect
For outdoor use

Current	15 kV for use on	27 kV for use on
<u>Rating</u>		
<u>Manufacturer</u>	<u>12.5/7.2 kV Systems</u>	<u>24.9/14.4 kV Systems</u>
<u>Amperes</u>		
Kearney 600	HB-65	HB-65
S & C Electric 600	XL	XL
Siemens-Allis 600	HR	HR
Southern States 400,600	BR	BR

NOTE: All switches should be furnished with NEMA standard insulators and with 110 kV BIL rating (15 kV systems) or 150 BIL ratings (25 kV systems) for station use.

Conditional List
sk
July 1989

sk - Switch, regulator by-pass - disconnect
For outdoor use

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Cooper Power Systems (McGraw-Edison) Type B, 15 kV, 400 amperes 110 kV BIL for station use 95 kV BIL for line use.	1035 (2/21/74)	To obtain experience

NOTE: All switches should be furnished with NEMA standard insulators and with 110 kV BIL rating for station use.

sl
July 1989

sl - Switch, Combination Power Fuse and Disconnect

(Used with an additional disconnect switch to by-pass
oil circuit reclosures at substations.)

<u>Manufacturer</u>	<u>15 kV for use on 12.5/7.2 kV systems</u>	<u>27 kV for use on 24.9/14.4 kV systems</u>
Hi Voltage	RFH	
Kearney	MHX	MHX
S & C Electric	SMD/LBD XS/LBD	SMD/LBD
Southern States	SF	

NOTE: All switches and cutouts should be furnished with NEMA standard
insulators.

Conditional List

sr
July 1989

sr - Steel for Substation Grounding, Copper-Clad or Galvanized

(See av-2 for copper grounding conductor)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Bethlehem Steel</u> 7/16" and 1/2" steel strand, BB grade, Class C galvanized	1015 (4/26/73)	1. To obtain experience 2. When used in soil with resistivity of 25 ohm- meters (2500 ohms per centimeter cube) or less, cathodic protection must be incorporated into the grounding design.
<u>Copperweld Steel</u> 40% conductivity DSA Copperweld Strand in sizes: 1/2" (7 No. 6 AWG) 9/16" (7 No. 5 AWG) 5/8" (7 No. 4 AWG) 13/16" (19 No. 6 AWG) 7/8" (19 No. 5 AWG)	954 (10/29/70)	1. To obtain experience 2. When used in soil with resistivity of 25 ohm- meters (2500 ohms per centimeter cube) or less cathodic protection must be incorporated into the grounding design.
<u>Indiana Steel & Wire</u> Steel Strand, BB Grade, Class C galvanized 5/8" (19 wire) 1/2" (7 wire) 9/16" (7 wire) 7/16" (7 wire)	1004 (11/16/72) 1133 (2/16/78)	1. To obtain experience 2. When used in soil with resistivity of 25 ohm- meters (2500 ohms per centimeter cube) or less cathodic protection must be incorporated into the grounding design.

vx
July 1989

vx - Cross Brace assembly, 3-3/8" x 5-3/8"
with hardware and fittings (Dwg. TM-110, REA Specification T-7)

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>American Crossarm & Conduit</u>	
Item 1-vx	1100-1
Item 2-vx	1100-2
<u>Brooks</u>	
Item 1-vx	X6685-1
Item 2-vx	X6685-2
<u>Cascadian</u>	
Item 1-vx	CCC-67-1
Item 2-vx	CCC-67-2
<u>Hughes Brothers</u>	
Item 1-vx	1042-1
Item 2-vx	1042-2
<u>Niedermeyer-Martin</u>	
Item 1-vx	N-6714-1
Item 2-vx	N-6714-2

Cross Brace Assembly, 3-5/8" x 7-1/2" Min.
with hardware and fittings

Applicable Specification: T-8
Drawing: TM-110A

<u>Manufacturer</u>	<u>Catalog No.</u>
American Crossarm & Conduit	1200
Brooks	X-6695
Cascadian	CCC69
Hughes	2061A
Niedermeyer-Martin	N6721

PART II

Underground Distribution Equipment

The realm of underground distribution has made quite significant advances in the past few years. Due to these advances and the increasing feasibility of underground rural distribution, most REA borrowers have placed some distribution equipment underground, are presently planning to, or are anticipating doing so in the future. If borrowers are to obtain reliable and economical underground systems, approved standards for construction and equipment must be observed.

Underground equipment considered suitable is being included in the "List of Materials Acceptable for Use on Systems of REA Electrification Borrowers." Specifications have been written and are available on much of this equipment. It must be realized that very little operating experience is available on this type equipment. Therefore, much of the underground equipment will be listed as "Conditional" until such experience is obtained that will warrant removing the "Conditional" listing. Listing of an item as "Conditional" does not mean that the item is inferior. Conditional means that service experience is desired so the item can be properly evaluated and demonstrate satisfactory performance before consideration for final acceptance.

Any comments or suggestions regarding the use or operation of the listed underground equipment will be welcome.

U ae
July 1989

U ae - Surge Arresters, Distribution
for Underground System Pole Risers
(Lightning Arresters)

<u>Manufacturer</u>	<u>Arrester Class</u>	<u>Arrester Type</u>	<u>Ratings - kV</u>
Cooper Power Systems (McGraw-Edison)	Distribution, normal duty	ES	9/10, 18
	Distribution, heavy duty	EL	9, 10, 18
General Electric	Distribution, heavy duty	Alugard	9, 10, 18
Joslyn	Distribution, normal duty	Q	9/10, 18
	Distribution, heavy duty	J	9/10, 18
Kearney	Distribution, heavy duty	Unigap	9, 10, 18
Ohio Brass	Distribution, normal duty	DA-III	9/10, 18
	Distribution, heavy duty	DA-IV	9, 10, 18
	Intermediate	GP	9, 10, 18
Westinghouse	Distribution, normal duty	GLV	9, 10
	Distribution, normal duty	LVBB	18

*Has intermediate class arrester characteristics but does not have intermediate class venting capability.

NOTE: The arresters listed on this page may be used singly or in parallel, but must be applied in accordance with paragraph VI.A., in REA Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

U ae - Arresters, Surge

(Shielded for Underground System Pad-Mounted Equipment)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Cooper Power Systems (RTE) Metal Oxide Elbow Arrester M.O.V.E. 9, 18 kV	1386 6/29/89	To obtain experience.
Elastimold (ESNA) Metal Oxide Elbow Arrester 10 kV 167ESA - 10 (15 kV interface) 18 kV 273ESA - 18 (25 kV interface)	1356 1/28/88	To obtain experience.
Joslyn Metal Oxide, Elbow Arrester Type 2E, 10, 18kV	1297 4/11/85	To obtain experience

Conditional List
U ae(2)
July 1989

U ae - Arresters, Surge

(For Underground System Pole Risers)

Cooper (McGraw-Edison)

Metal Oxide AZR	1287	To obtain experience.
Intermediate class	9/27/84	
9, 10, 18, 27 kV	1386	
	6/29/89	

General Electric

Metal Oxide, Tranquell**	1292	To obtain experience.
U.D. II 9, 10, 18 kV	1/10/85	

Metal Oxide, Tranquell

Intermediate Class	1386	To obtain experience.
9, 10, 18, 27 kV	06/29/89	

Joslyn

Metal Oxide, Type ZJ	1266	To obtain experience.
U.D. 9, 10, 18 kV	9/22/83	

Metal Oxide, Type ZR

Intermediate Class*	1266	To obtain experience.
9, 10, 18 kV	9/22/83	

Ohio Brass

Metal oxide type	1236	To obtain experience
DynaVar 9, 10, 18kV	6/10/82	
Porcelain, VR	1378	
Polymer, PVR	2/9/89	

Metal Oxide, DynaVar

Intermediate Class	1236	To obtain experience.
9, 10, 18 kV	6/10/82	

Westinghouse

Metal Oxide, HMX	1320	To obtain experience.
HEAVY DUTY: 9, 10, 18 kV	5/8/86	

Metal Oxide, RMX

Intermediate Class*	1320	To obtain experience.
9, 10, 18 kV	5/8/86	

*Has intermediate class arrester characteristics but does not have intermediate class venting capability.

**A non fragmenting U.D. II Arrester is available for 9 & 10 kV designs at higher cost when specified.

U an - Transformers, distribution
pad-mounted, dead-front

(For underground application)

Applicable Specifications: "REA Specifications for Pad-Mounted Transformers," U-5.

<u>Manufacturer</u>	<u>Single Phase</u>	<u>Three-Phase</u>
Central Moloney (2, 4)	"REA-LP" 25-167 kVA	
Cooper (2, 4)	"REA Shrubline/Series 20 REA" 15-167 kVA	"REA Terra-Tran" 45-2500 kVA
Dowzer (3, 4)	"METRI-PAD" 25-167	"PM3W-R" 75-500 KVA
ERMCO (2, 4)	"Low-Profile" 10-167 kVA	
General Electric (2, 4)	"Mini-Pad III - REA" 10-167 kVA	"Compad IV - REA" 75-2500 kVA
Howard (2, 4)	"Hi Pad REA" 10-167 kVA	"Hi Pad 3 REA" 45-2500 kVA
Kuhlman (2, 4)	"Lo-Pak ELR" 25-167 kVA	"K-PAK-3 REA" 750-2500 KVA
NECO/Hammond (2)	HMM-R, 10-50 kVA SP-R, 75-167 kVA	TP-R, 45-1000 kVA
Pauwels-Chance(2,4)	"Turf-Hugger-R" 10-100 KVA	"Turf-hugger-R" 45-500 KVA
H. K. Porter (2, 4) (Delta-Star)	"Low Profile U 5-R" 25-167 kVA	"Porter U5-R3" 225-2500 kVA
United (Ky, AEC)(2, 4)	"Pad-Mount" 15-75 kVA	

- (1) 7.2/12.5 and 7.6/13.2 kV
- (2) 7.2/12.5, 7.6/13.2 and 14.4/24.9 kV
- (3) 7.2/12.5 and 7.6/13.2 kV (conditional listing for 14.4/24.9 kV)
- (4) Dual Voltage - Same as for 14.4/24.9 kV, single phase
- (5) Three-phase listing applies to 7.2/12.5 and 7.6/13.2 kV only
- (6) 14.4/24.9 kV

U an-1.2
July 1989

U an - Transformers, Distribution,
Pad-Mounted, Dead-Front

(For Underground Application)

Applicable Specifications: REA Specifications for Pad-Mounted
Transformers - U5

<u>Manufacturer</u>	<u>Single Phase</u>	<u>Three-Phase</u>
VanTran (3, 4)	"Mini-Pad U5" 5-167 kVA	"VanTran III-U5" 30-2500 kVA
Westinghouse 2, 4)	"Mini-Pak U-5" 25-167 kVA	Type MTR 75-1500 kVA "Plazapad-U5" 2000-2500 kVA

- (1) 7.2/12.5 and 7.6/13.2 kV
- (2) 7.2/12.5, 7.6/13.2 and 14.4/24.9 kV
- (3) 7.2/12.5 and 7.6/13.2 kV (conditional listing for 14.4/24.9 kV
- (4) Dual voltage - same as for 14.4/24.9 kV, single phase
- (5) Three-phase listing applies to 7.2/12.5 and 7.6/13.2 kV only

U an - Transformers, Distribution
Pad-Mounted, Dead-Front

(For unit residential underground application, 7.2/12.5
and 7.6/13.2 kV, 5-25 kVA single phase only)

<u>Manufacturer</u>	<u>Type</u>
Central Moloney	"REA-Mini-LP" 10-25 kVA
Cooper	"Ranch Runner" 10-25 kVA
ERMCO	"REA-Micro Pad" 10-25 kVA
General Electric	"Micro-Mini-Pad" 10-25 kVA
Howard	"Spacesaver Pad" 10-25 kVA
NECO/Hammond	"Little NECO-R" 10-25 kVA
Pauwels-Chance	"Turf Hugger II" 10-25 kVA
VanTran	"Mite'E'Mini" 5-25 kVA
Westinghouse	"Micro-Pak U-5" 10-25 kVA

Conditional List
 U an(1)
 July 1989

U an - Transformers, Distribution
 Pad-Mounted, Dead-Front

(For underground application)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Cooper Power Systems (RTE)</u> 7.2/12.5, 7.62/13.2, 14.4/24.9 kV and dual voltage, single phase, self protected, padmount distribution transformer with Magnex Interrupter	1376 1/12/89	To obtain experience
<u>General Electric</u> Single phase transformers with internal Tranquell Under-Oil Arrester "Mini-Pad III - REA" (10-167 kVA) 7.2/12.5 and 7.6/13.2, 14.4/24.9 kV and Dual Voltage "Micro-Mini-Pad" (10-25 kVA) 7.2/12.5 and 7.6/13.2 kV Three phase transformers with internal Tranquell Under-Oil Arrester "Compad IV-REA" 7.2/12.5, 7.6/13.2, 14.4/24.9 kV and Dual Voltage Single-phase "Mini Pad-REA" 25 & 50 kVA transformers with amorphous metal cores 7.2/12.5, 7.6/13.2 14.4/24.9 kV and Dual Voltage Three-phase transformers 75-500 kVA with amorphous metal core "Compad IV-REA" 7.2/12.5, 7.6/13.2, 14.4/24.9 kV and Dual Voltage	1316 (3/6/86) 1316 (3/6/86) 1316 (3/6/86) 1363 (5/26/88) 1320 5/8/86 1363 (5/26/88)	To obtain experience. To obtain experience. To obtain experience. To obtain experience. To obtain experience.
<u>Hevi-Duty</u> Three-Phase SBI-DF 750-2500 kVA 7.2/12.5 & 7.6/13.2 kV	970 (7/1/71) 1153 (12/21/78)	1. To obtain experience. 2. Test reports on 750 and 2000 kVA to be submitted as available.
<u>Square D</u> Three-phase Class 7230 REA 75-2500 KVA 12.5/7.2 & 13.2/7.6 kV	1298 (4/25/85)	To obtain experience.

U an - Transformers, distribution, submersible

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
Central Moloney Type URD, 25-100 kVA	843 (6/16/66)	To obtain experience.
General Electric Type RST, 25-100 kVA	847 (8/11/66)	To obtain experience.
Howard 25-100 kVA	1139 (5/18/78)	To obtain experience.
Kuhlman 25-100 kVA	901 (9/12/68)	To obtain experience.
Westinghouse Type SPB, 25-100 kVA	843 (6/16/66)	To obtain experience.

U ax
July 1989

U ax - Cutout and Arrester, Combination
for Underground System Pole Risers

Nominal System Voltage	For 12.5Y/ 7.2 kV		For 13.2Y/ 7.6 kV	For 24.9Y/ 14.4 kV
Cutout Maximum Voltage Rating	7.8 kV	15 kV	15 kV	27 kV
Application	1Ø Risers	3Ø Risers	1Ø and 3Ø Risers	1Ø and 3Ø Risers
Cutout Current Rating	100 amps	100 amps	100 amps	100 amps

<u>Manufacturer</u>	<u>Catalog Numbers</u>			
Chance	C71D-112PB Series	C71D-112PB Series	C71D-112PB Series	C71F-211PB Series
Cooper (McGraw- Edison)	AFS300B Series	AFS300C Series	AFS300C Series	AFS300D Series
General Electric	9F80	9F80	9F80	9F80
Joslyn	J9237-P2	J9237-P2/R	J9237-P2-R	J9267-D2
Southern States	CA Series	CA Series	CA Series	CA Series
Westinghouse	7.8LBU-II/ 10 LV	15LBU-II/ 10 LV	15LBU-II/ 10 LV	24.9LBU-II/ 18 LV

NOTE: The units listed on this page may be used with single arresters or arresters in parallel, but must be applied in accordance with paragraph VI.A. in REA Bulletin 61-3, "Underground Rural Distribution." Other arresters listed on pages ae-1 and ae-2 may be used for underground systems when applied in accordance with this bulletin.

Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

Either normal duty or heavy duty distribution class arresters listed on page ae-1 are acceptable for use with these combination units.

Uax - Cutout and Arrester

Combination for Underground System Pole Risers

Nominal System Voltage	For 12.5Y/7.2 kV	For 13.2Y/7.6 kV	For 24.9Y/14.4 kV	Conditions
Cutout Maximum Voltage Rating	7.8 kV	15 kV	27 kV	
Application	10 Risers	30 Risers	10 and 30 Risers	
Cutout Current Rating	100 amps	100 amps	100 amps	

Metal Oxide Type Arresters

Manufacturer

Catalog Numbers

Joslyn (Distribution) Meeting No. 1266 (9/22/83)	J9237-ZJ2	J9237-ZJ2/R	J9267-ZJ2	To obtain experience.
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Note 1: Other arresters listed on pages ae-1 and ae-1 may be used for underground systems when applied in accordance with REA Bulletin 61-3, "Underground Rural Distribution."

Note 2: Cutouts used on underground riser poles should be loadbreak type or have hooks for portable load interrupters.

Conditional List

U be
July 1989

U be - Reclosers, pad-mounted

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
* <u>Cooper Power Systems</u> (McGraw-Edison)	1373	To obtain experience.
Single phase, vacuum interrupter, Type PV4H Maximum voltage 14.4 kV for 12.5 and 13.2/7.62 kV	11/17/88	
*Ratings greater than 100 amp. for 12.5/7.2 kV application, and greater than 200 amp. for 24.9/14.4 kV application are acceptable only with ground trip devices.		

U cg - Switch, air, three-pole, group-operated
for pole-mounted cable risers
(Factory Preamsembled)

<u>Manufacturer</u>	<u>Mounting</u>	<u>Vertical Break</u> <u>Type</u> <u>kV</u>	<u>Side Break</u> <u>Type</u> <u>kV</u>
Chance	Vertical		D7(L)15-27
	Horizontal		D7(L)15-27
S & C	Vertical		Alduti(L)15-25
	Horizontal		Alduti(L)15-25
Westinghouse	Vertical	LB3-VR(L)15	

(L) Means gas or solid material full-load interrupters are accepted and available.

NOTE: Switches with factory-assembled crossarm type bases must have nonconducting crossarm type bases, nonconducting braces, and insulated interphase and control rods.

Conditional List
U cg
July 1989

cg - Switch, Air, Three-Pole, Group Operated

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>S & C</u>		
Omni-Rupter (L), side break	1355	To obtain experience.
horizontal and vertical	1/14/88	
mounting with non-conducting		
crossarm type base and	1371	" " "
insulated interphase and	10/6/88	
control rods,		
15 kV and 25 kV		

(L) Means full-load interrupter accepted and available.

U fw
July 1989

U fw - Secondary Tap Connector

Manufacturer

Type or Catalog No.

Raychem

Compression Connectors

CTE-300-00

CTE-400-00

CTE-500-00

Standard Split Bolt

CTE-300-00

CTE-400-00

U fz-1
July 1989

U fz - Transformer Connector Block, Insulated
Multiple Cable Connectors

Watertight - For use in all locations.

<u>Manufacturer</u>	<u>Connection Type</u>	<u>Catalog Number</u>
Blackburn	Lug	SCU, with lugs and sleeves
Burndy	Lug	Stud Mole with sealing sleeve
Utilco	Set Screw	PTF-SS, Watertight Insulated transformer Connector block

Non-Watertight - For use in above grade locations only

Alcoa	Lug	Interchange 1 ABBD Series (Disconnectable) Use with A9 insulating boots
Alcon	Set Screw	VBTT Series with double sealing sleeve
Blackburn	Set Screw	TSB-J58C (Permanent)
	Set Screw	TSB-D58C (Disconnectable)
Connector Mfg. Co.	Set Screw	Uni-Joint Bar Connectors, (Series RLS, NSM-C, NDS-C, NSC ZS-C, ZSU-C, RLUS) (Permanent)
	Set Screw	Uni-Joint Bar Connectors, (Series RLSS, NSSM-C, NSSC, ZQC, ZQU-C, RLUS) (Disconnectable)
Electrical Spec. Prod.	Lug	Type SU (Permanent)
	Lug	Types SUR and RDSR (Removable) (With Types LA and A1 lugs and Sleeve kits)
	Set Screw	Type UPS-I (Permanent) Type UPM-I (Disconnectable)
Fargo	Bolted	GUC Series
	Set Screw	GUS-600S Series
Homac	Lug	DF Series
	Lug	FTU 125 Series (Disconnectable) with flood seal sleeve kit
	Set Screw	LRT Series
Penn Union	Lug	Type DBAT (Permanent)
	Lug	Type DBAT-LH (Disconnectable) Use with Series DBTB, DBTBF and DBTH lug and Sleeves kits
Reliable	Set Screw	15912-REA (Disconnectable)
Utilco	Set Screw	PTF-IN (Permanent)
	Set Screw	PTF-CJU (Disconnectable)

Note: Additional insulation may be required with some of the above-listed secondary terminal blocks due to the irregularity of mating surfaces between various secondary studs being supplied by the transformer manufacturers.

U fz-2
July 1989

U fz - Transformer Connector Block, Insulated

Single Cable Connectors

Non-Watertight - For use in above grade locations only

Manufacturer

Electrical Specialty Products

Catalog Number

Type SM transformer bushing
connector kit. (Stud to
aluminum cables through 350 kcmil)

NOTE: Additional insulation may be required with some of the above-listed secondary terminal blocks due to the irregularity of mating surfaces between various secondary studs being supplied by the transformer manufacturers.

U gc
July 1989

<u>Manufacturer</u>	U gc - Shield, cable riser	
	<u>Dia. (Inches)</u>	<u>Length (Feet)</u>
	<u>Galvanized Steel</u>	
Chance	2 - 3 - 3-1/2	5 - 9
*Cooper Power Systems (McGraw-Edison)	2 - 3 - 4	3 - 5 - 10
*Electrical Materials	2 - 3 - 4 - 5	5
*#Fargo	2 - 3 - 3-3/4 - 5	5 - 8 - 10
*Joslyn	2 - 3 - 3-1/2	5 - 8
Midland-Ross (Kindorf Snapduct)	2 1/2 - 3 1/2 - 5 (14 ga. galv. steel)	2 1/2 - 5 - 10

Plastic and Fiberglass

Carlton	2 - 3 - 4 - 5	10
Custom Plastics	2 - 3 - 4 - 5	5 - 10
*Electrical Materials (plastic)	2 - 3 - 4 - 5	5 - 10
*Hercules (Haskon) (plastic) (Power Mold, I, II, III)	2 - 3 - 4 - 5	5 - 9 - 10
*Joslyn (plastic)	2 - 3 - 4 - 5	5 - 10
*Nordic (fiberglass)	2 - 3 - 5	5 - 10

(Order by size and length)

#All sizes available with galvanized finish or painted-over galvanizing.

*All sizes available with back plate.

Full Round**

Smith Fiberglass Products (standard wall)	2 - 3 - 4 - 5	30
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**Full round riser shield is to be mounted directly to the surface of the pole with no standoffs.

U gk - Terminations, Indoor

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter.)

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Blackburn</u>	Type SKD Stress Cone (15, 25 & 35 kV)
<u>Cooper Power Systems (RTE)</u>	Fasterm Stress Cone (15 & 25 kV)
<u>Elastimold (ESNA)</u>	Style 35-MSD (15, 25 & 35 kV)
<u>General Electric</u>	Termi-Matic, Type A or G (15, 25 & 35 kV)
<u>Joslyn</u>	J9275 (15 kV)
<u>Plymouth/Bishop</u>	Stress-Wrap (15, 25 & 35 kV)
<u>Raychem</u>	Thermofit HVT (15, 25 & 35 kV) CST (15 kV)
<u>Sigmaform</u>	Q-Cap Series STK-I (15 & 25 kV)
<u>3M</u>	Quick Term II Series (15, 25 & 35 kV)

U gk-2
July 1989

U gk - Terminations, outdoor
(with mounting hardware)*

(When ordering, specify conductor size, type, whether
copper or aluminum, insulation diameter, and type of
mounting desired.)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Blackburn</u>	Type MT (15, 25 and 35 kV)
<u>Elastimold (ESNA)</u>	Style 16-THG (15 and 25 kV) Style 35-MT (35 kV)
<u>General Electric</u>	Termi-Matic, Type G (15, 25 and 35 kV)
<u>Joslyn</u>	"Easy-On II" (15, 25 and 35 kV)
<u>3M</u>	5900 Series 15 kV (4/0 AWG and larger) 25 kV (#2 AWG thru 750 kcmil) "Quick-Term II" (15, 25 and 35 kV) 5600 Series (for bare concentric neutral cable) 5640 and 5650 Series (for jacketed cable)

*Mounting hardware is used to attach termination to mounting bracket (U hd or
U hj).

U gk - Terminations, Outdoor
(With Mounting Hardware)*

(When ordering, specify conductor size, type, whether
copper or aluminum, insulation diameter, and type of
mounting desired.)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Cooper Power Systems</u> (RTE)	Fasterm Series (15 & 25 kV)
<u>G & W</u>	"Eliminator" 15 kV, E 25 kV, E 35 kV, E
<u>Plymouth/Bishop</u>	SWO Kit (15, 25 and 35 kV)
<u>Raychem</u>	Thermofit HVT (15, 25 and 35 kV) CST (15 kV)
<u>Sigmaform</u>	Q-Cap Series STK (15 & 25 kV)

*Mounting Hardware is used to attach termination to mounting bracket (U hd or U hj).

U gn-1
July 1989

U gn - Enclosures, equipment

Applicable Specifications: "REA Specifications for Equipment Enclosures,"
U-4

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Durham</u>	Series 4242 (dead-front) Series 5454 (dead-front) Series 3452 (dead-front)
<u>Electrical Equipment</u>	TH1-DF Series (dead-front)
<u>Elliott</u>	EPM-PTS (dead-front)
<u>K & M Engineering</u>	KM Series (Dead-front with penta-head bolt)
<u>Malton Electric</u>	1-Phase Single Unit (dead-front)
<u>Maysteel</u>	E/L100 (dead-front)
<u>Northern Plastics</u>	Garrison NPG Series (dead-front)
<u>Western Power Products</u>	FG-DF1 (dead-front) FG-DF3 (dead-front)

NOTE: The above enclosures are available with various multipoint terminations. The owner should specify termination points to be provided.

U gn - Enclosures, Equipment

Sectionalizing Enclosures

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Carolina Dielectrics</u>	Model 0501
<u>Durham</u>	15 kV AMSP-0 (Single-Phase) AMSP3-0 (3-Phase) 25 kV AMSP2-0 (Single-Phase) AMSP4-0 (3-Phase)
<u>Electrical Equipment</u>	LPT-228-P LPT-249-P 3Ø LPT-266-P 3Ø
<u>Maysteel</u>	CW200 Series CW300 Series
<u>Nordic</u>	ND Series
<u>Shallbetter</u>	SPMS Series (dead-front)
<u>Western Power Products</u>	Model 24-1 Model 34-2 Model SPM-320 1Ø Model SPM-540 3Ø
<u>Willow</u>	WHC Series WRC Series

NOTE: The above enclosures are available with various multipoint terminations. The owner should specify termination points to be provided.

U gn-2.1
July 1989

U gn - Enclosures, equipment

Sectionalizing Enclosures

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Galva-Closure Products</u>	Series AG Series BB
<u>Hoffman</u>	U-J Series junction enclosures U-JGS Series ground sleeves
<u>Malton Electric</u>	MEJ Series ME Series MEH Series
<u>Vertex Plastics</u>	1826B, 1Ø 1826C, 1Ø 1881, 3Ø
<u>Wheelock and Son</u>	Single phase and three phase

*For pole mounting

**For crossarm mounting

U gn - Enclosures, Equipment

Manufacturer

Catalog No.

Cooper Power Systems (RTE)

SectER Series 400L (1Ø)
SectER Series 450L (3Ø)

Highline

HL80P-15 (15 kV)
HL81P-15 (15 kV)
HL90P (15 kV)

Sectionalizing Enclosures

Ranger

TE-501, TE-503

U go
July 1989

U go - Fault Indicator
(For Construction Unit UM6-4)

<u>Manufacturer</u>	<u>Type</u>
Cooper Power Systems (McGraw-Edison, RTE)	Linam TPR, LV, MR
Edison Control Corporation	Series EC100 (single phase) Series EC300 (three phase) Available with mounting kit KT5002)
Fisher Pierce	Series 1514 (To be used on single-phase circuits only)

U gp - Connector Blocks and Splices, Secondary

Watertight - For Use In All Locations

<u>Manufacturer</u>	<u>Connection Type</u>	<u>Catalog Number</u>
Alcon	Set Screw	VPB Series
AMP	Compression	600 Volts secondary UG Distribution 4-way and 6-way bus system
Blackburn	Lug Set Screw	Series UP(with lugs and sleeves) Series USB(1000 amp bus with sleeves)
Burndy	Lug	URD Mole
Connector Mfg. Co.	Compression Set Screw	Utilug Sure Seal Splice Kits, Series SSK, SSKL Uni-Joint Sure Seal Series SSBC
Electrical Spec. Products	Lug Set Screw	Type UC (8 AWG - 500 kcmil) (with LA lug and sleeve) Type UB (with sleeve) splice Type ACL-HSH (6 AWG - 500 kcmil)
Fargo	Set Screw	GU-600 Series
Homac	Lug Lug Set Screw Set Screw Compression	FS-95 Series with flood seal sleeve kit (8AWG - 350 kcmil) FS-125 Series with flood seal sleeve kit (350 - 500 kcmil) SHC Series RAB Series RRK Series (#3/0 and #4/0)
Kearney	Compression Compression	HCR HAR
Penn Union	Lug	DBA Series with DBTB, DBTBF and DBTH Series lug and sleeve kits
Reliable	Set Screw	15903-15908, 15910 with sleeve kit (4 AWG - 350 kcmil) 15911 with sleeve kit (500 - 750 kcmil)
Utilco	Set Screw	Safety Sub Splice - USPA-350SS

U gp-2
July 1989

U gp - Connector Blocks and Splices, Secondary

<u>Non-Watertight - For Use In Above-Grade Pedestals Only</u>		
<u>Manufacturer</u>	<u>Connection Type</u>	<u>Catalog Number</u>
Blackburn	Set Screw	Type PSB-C
Connector Mfg. Co.	Set Screw	Uni-Joint Series NCA
Electrical Spec. Prod.	Set Screw	UPC Series
Fargo	Set Screw	GUS-6000 Series
Homac	Set Screw	CLR-350 Series
	Set Screw	PVAB Series
Utilco	Set Screw	PED-350-IN Series

U gq
July 1989

U gq - Boot or sleeve, insulated*

<u>Manufacturer</u>	<u>Catalog Number</u>
Blackburn	MPC9 MPC15
Electrical Materials	100-B (For pad-mounted transformer spade terminals)

*Use restricted to 120/208 volt 500 kVA transformers and larger not equipped with threaded studs.

U gu-1
July 1989

U gu - Pedestal, Power

Refer to Construction Drawings UK5 and UM5-5

Applicable Specifications: "REA Specifications for Secondary Power
Pedestals," U-6

<u>Manufacturer</u>	<u>Inside Dimensions</u> <u>Inches</u>	<u>Height</u> <u>Inches</u>	<u>Catalog No.</u>
Coil Sales (Charles Industries)	8.25 Dia	31-1/2	CPLP-8
	8.25 Dia	31-1/2	CPLP-8I(Integral Stake)
	10.75 Dia	31-1/2	CPLP-10
	10.75 Dia	31-1/2	CPLP-10I(Integral Stake)
Fargo	8 x 8	38	UP-1520C
	8 x 8	44	UP-1620C
	8 x 12	27	UP-1720C
	8 x 12	44	UP-1820C
	10 x 10	27	UP-2320C
	10 x 10	38	UP-2220C
	10 x 10	43	UP-2420C
	10 x 16	37	UP-2520C
Nordic	8 x 8	44	PR-50, PR-55
	9 x 14	30	PR-149 (stake)
			PR-150 (stakeless)

*Furnished with stake.

**Pole mounted

U gu - Pedestal, Power

Refer to Construction Drawings UK5 and UM5-5

Applicable Specifications: "REA Specifications for Secondary Power Pedestals," U-6

<u>Manufacturer</u>	<u>Inside Dimensions Inches</u>	<u>Height Inches</u>	<u>Catalog No.</u>
Reliable	8 x 8	38	UP 8HLP
	8 x 8	46	UP 8HP
	10-1/2 x 10-1/2	26	UP 10HLP
	16-1/2 x 10-1/2	36	UP 1016HLP
	10-1/2 x 10-1/2	42	UP 10HP
Shallbetter	7.5 x 10.25	39	SUTP Series
Vertex	8 x 14	30	SP 814
Western Power	8 x 8	30	*SP-8, DF-3 (dead- front)
	9 x 9	30	*SPMC-9-DF3
	9 x 9	30	SPM-90, DF-3 (stakeless)
	9 x 14	30	*SPMC-14-DF3
	9 x 14	30	SPM-140, DF-3 (stakeless)

*Furnished with stake.

**Pole mounted

U gu-2
July 1989

U gu - Power Pedestal
Refer to Drawings UK6 and UM5-5

Applicable Specifications: "REA Specifications for Secondary Power Pedestals," U-6

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Armorcast</u>	Polymer concrete frame and cover with fiberglass reinforced polyester skirting 6001 Series.
<u>Associated Plastics</u>	Molded polyethylene with galvanized steel or plastic cover Catalog Nos. 1730-1, 3; 1324-1, 3
<u>Blackburn</u>	Molded polyethylene with galvanized steel cover and ground lug. Catalog No. SDR-2PG
<u>Burndy</u>	Molded polyethylene with galvanized steel cover. Catalog No. URD20G23
<u>Carson</u>	Molded polyethylene with plastic cover Catalog No. 1324-12B and 1730-12B
<u>CDR Systems (Homac)</u>	Fiber reinforced polymer concrete PA Series with penta-head bolts

U gu - Power Pedestal
Refer to Drawings UK6 and UM5-5

Applicable Specifications: "REA Specifications for Secondary Power
Pedestals," U-6

<u>Manufacturer</u>	<u>Catalog No.</u>
<u>Dexol</u>	HDPE, DX-101 DX-102 ABS, DX-101HD DX-102HD
<u>Fargo</u>	HDPE, B-100R Series ABS, B-200R Series
<u>Highline</u>	HL50AE HL51
<u>Mo. Ped.</u>	Molded high density polyethylene with HDPE cover, Model No. 186
<u>Pen-Cell</u>	Molded polyethylene with galvanized steel or plastic cover Catalog No. PE-20-REA Polycarbonate Box cover Catalog No. AG-20-6-REA

U gv
July 1989

U gv - Stake, Power Pedestal
Refer to Construction Drawing UK5

<u>Manufacturer</u>	<u>Length Inches</u>	<u>Catalog No.</u>	
		<u>For Power Pedestal Only</u>	<u>For Joint Pedestal</u>
Fargo	42-60-72-78	UP-530S Series	UP-530J Series
Nordic	48-60-72	PM Series	
Reliable	72-78-84	DM Series	DM Series

U hb - Cable Accessories
(When ordering specify conductor size, type whether
copper or aluminum and insulation diameter)

(Items on this page are rated for operation on three-phase systems
and may be used on single-phase systems.)

200 Ampere Continuous Current Rating

Manufacturer

Catalog No.

Blackburn

15 kV, used with loadbreak connectors
Type ABOC insulating cap
Type JLB2BA bushing plug
25 kV, used with load break connectors
Type JLB2C10 bushing plug
Type DR2C insulating cap

Elastimold (ESNA)

15 kV, used with loadbreak connectors
Style 1601-CL cable lead
Style 1602A3R feed thru insert
Style 1601-A3R bushing plug
Style 160-DR insulating cap

25 kV, used with loadbreak connectors
Style 2701-A2 bushing plug
Style 270-DR deadend receptacle

35 kV, used with loadbreak connectors
Style 3701A-3 bushing plug*
Style 370DR(G) insulating cap

General Electric

15 kV, used with loadbreak connectors
Switch module 9U02AAB001
Basic connector module 9U05 Series
Insulating cap 9U01AEW400
Feed-through insert 9U04AEB001

25 kV, used with loadbreak connector
switch module 9U02BAB001
Insulating cap 9U01BEW500
Feed-through insert 9U04BEB001)

U hb-1.1
July 1989

U hb - Cable Accessories

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

(Items on this page are rated for operation on three-phase systems
and may be used on single-phase systems.)

Manufacturer

Catalog Number

Cooper Power Systems (RTE)

15 kV, used with loadbreak connectors
No. 2603711A12M protective cap
No. 2604797B01M bushing well insert
No. 2637345A01M two-way bushing
well insert
No. 2604231B01 bushing well plug
25 kV, used with loadbreak connectors
No. 2606591A02M protective cap
No. 2604982B01M bushing well insert
No. 2637157B01M two-way bushing
well insert
No. 2604231B01 bushing well plug
35 kV, used with loadbreak connectors
No. 2637592B03M protective cap

Joslyn

15 kV, used with loadbreak connectors
Type LBIC152 Insulating Cap

25 kV, used with loadbreak connectors
Type LBIC252 Insulating Cap

U hb - Cable Accessories

(When ordering, specify conductor size, type, whether
copper or aluminum and insulation diameter)

600 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Blackburn</u>	15 kV, used with non-loadbreak connectors Types 6B and 65B 25 kV, used with non-loadbreak connectors Types 6C and 65C
<u>Cooper Power Systems (RTE)</u>	15 kV Deadbreak termination connectors No. 2637324B (with stud) No. 2637222B (without stud) Push-OP System Optional 200 A. loadbreak tap No. 2637939B 25 kV Deadbreak termination connectors No. 2637324B (with stud) No. 2637222B (without stud) Push-OP System Optional 200 A. loadbreak tap No. 2637940B 35 kV Deadbreak termination connectors No. 2637462B (with stud) No. 2637101B (without stud) Optional 200 A. loadbreak tap No. 2637941B
<u>Elastimold (ESNA)</u>	15 kV, used with non-loadbreak connectors 600, 650 Series 25 kV, used with non-loadbreak connectors K600, K650 Series 35 kV, used with non-loadbreak connectors 750LR Series
<u>Joslyn</u>	15 kV, used with non-loadbreak connectors PES86/PSS86 25 kV, used with non-loadbreak connectors PES86--S/PSS86--S
<u>3M</u>	15 kV, Deadbreak termination connectors 5815 Series Modular Splicing System

Conditional List
U hb(1)
July 1989

U hb - Cable Accessories

(When ordering specify insulation diameter)

Concentric Neutral Clamps (Bonding)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Harco</u> URD cable clamp	1114 (5/12/77)	<ol style="list-style-type: none">1. To obtain experience2. Only for bonding of anodes or other metals to the neutrals of <u>existing</u> cable installations.3. Not to be used to connect neutral to grounding electrodes

U hc - Cable Supports
15 and 25 kV

<u>Manufacturer</u>	<u>Catalog Number</u>	<u>Grip Dia. Range (inches)</u>
Aluma-Form	CS-800 Series	0.75 to 2.0
Economy Cable Grip	SPJ087-U	0.87 to 1.00
	SPJ100-U	1.00 to 1.12
	SPJ113-U	1.12 to 1.25
	SPC125-S-U	1.25 to 1.50
Fargo	GJ-854	0.718 to 0.919
	GJ-855	0.920 to 1.12
	GJ-856	1.12 to 1.50
Kellums	022-16-011	0.81 to 0.94
	022-16-012	0.87 to 1.00
	022-16-013	0.94 to 1.06
	022-16-014	1.00 to 1.18
	022-16-015	1.06 to 1.25
	022-01-018	1.25 to 1.50
Lewis	A-U-SW-18	0.75 to 1.25
	U-1.12	1.12 to 1.62
Slater	FCSD 14	0.82 to 0.95
	FCSD 15	0.88 to 1.00
	FCSD 16	0.95 to 1.06
	FCSD 17	1.01 to 1.19
	FCSD 18	1.07 to 1.26
	FC125-U	1.25 to 1.50
Woodhead	35032 (SC075-U)	0.75 to 0.99
	35033 (SC100-U)	1.00 to 1.24
	35034 (SC125-U)	1.25 to 1.50

U hd
July 1989

U hd - Brackets, pothead mounting and
Brackets, combination pothead and
arrester mounting

Manufacturer

Aluma-Form

Single Phase

TB-EMB-1-2PA

Three Phase

TB-EMB-1-6PA

U he - Enclosures, Sectionalizing Equipment

12.5/7.2 kV

Manufacturer

Catalog Number

Durham

Model FTSP-CL, single phase pad-mounted
1 thru 4 fused taps
Model FTSP-CL3, three-phase pad-mounted
1 and 2 fused taps

Electrical Equipment

FTDF-P Series, single and three-phase
one and two fused taps, pad-mounted
*GGCL-P Series, single and three-phase,
pad-mounted

Elliott

Type EPMR, single and three-phase,
pad-mounted

Powercon

Type PMF, single-phase, pad-mounted
Type PMF-8.3, three-phase, pad-mounted

*Furnished with current limiting fuses.

NOTE 1: Enclosures on this page must comply with the dead-front requirements of REA Spec. U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U he-1.1
July 1989

U he - Enclosures, Sectionalizing Equipment

12.5/7.2 kV

Manufacturer

Catalog Number

Cooper Power Systems
(McGraw-Edison)

EH3A Series, single-phase, pad-mounted

G & W

PLDR, PFLDR (submersible and pad-mounted)
single-phase and three-phase, fused or
unfused switchgear. (Choice of deep well
or deadbreak bushings), (Must specify
pentahead security bolt when ordering)

Malton

MEF21

S & C

Mark III, Models PMS (with option G-7)
200 ampere three-pole switching and
200 ampere single-pole switching

Shallbetter

SPMD Series, single and three-phase,
pad-mounted
SPMC Series, 200 ampere single-pole switching

Westinghouse

UTE, PAD-PAK pad-mounted switching device,
single and three-phase, 300 amp

NOTE 1: Enclosures on this page must comply with the deadfront requirements
of REA Spec. U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may
cause ferroresonance. Refer to REA Bulletin 61-3.

U he - Enclosures, Sectionalizing Equipment

24.9/14.4 kV

Manufacturer

Catalog Number

Elliott

Type EPMR, single- and three-phase, pad-mounted

G & W

PLDR, PFLDR (submersible and pad-mounted)
single-phase and three-phase, fused or
unfused switchgear (Choice of deep well
or deadbreak bushings), (Must specify
pentahead security bolt when ordering)

Powercon

Type PMF, single-phase pad-mounted
Type PMF, three-phase pad-mounted

NOTE 1: Enclosures on this page must comply with the dead-front requirements of REA Specification U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U he-2.1
July 1989

U he - Enclosures, Sectionalizing Equipment

24.9/14.4 kV

Manufacturer

Catalog Number

Cooper Power Systems (RTE)

Type LBS, single- and three-phase, pad-mounted, 300 amp
FuseTER Series, single-phase and three-phase

Shallbetter

SPMD Series, single and three-phase,
pad-mounted

Westinghouse

UTE, PAD-PAK pad-mounted switching device,
single and three-phase, 200 amp

NOTE 1: Enclosures on this page must comply with the deadfront requirements of REA Specification U-4.

NOTE 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U he - Enclosures, Sectionalizing Equipment

(600 amp)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Chance</u>	Type LVS (submersible and pad-mounted) single-phase and three-phase, vacuum switching equipment, fused or unfused, 200 or 600 amp, 15-25 kV
<u>Electrical Equipment</u>	Type PSI, 15 kV, 25 kV, 600 amp., three-phase switching, and 200 amp., single-phase switching. (When ordering, add suffix B-4)
<u>Elliott</u>	Type EPMR, Single and three-phase, pad-mounted, 25 kV
<u>Kearney</u>	Series VE - pad-mounted, 15 kV and 25 kV, single-phase and three-phase vacuum switching, fused or unfused, 200 or 600 amps Series VP - submersible, single-phase and three-phase, vacuum switching, 200 or 600 amp, 15 and 25 kV, with or without VACOP remote operator

Note 1: Enclosures on this page must comply with the deadfront requirements of REA Spec. U-4.

Note 2: Single-pole switching of three-phase underground circuits may cause ferroresonance. Refer to REA Bulletin 61-3.

U he-3.1
July 1989

U he - Enclosures, Sectionalizing Equipment

(200 and 600 amp.)

Manufacturer

Catalog Number

Cooper Power Systems (RTE)

Type LBS, single- and three-phase,
pad-mounted 15 kV
Type R-VAC, three-phase vacuum switchgear,
15-25 kV

Joslyn

Types PG6, PFG6, LPG6, LPFG6, SG6, SFG6
(submersible and pad-mounted, fused or
unfused) single and three-phase switching
equipment, 200 and 600 amp, 15 or 25 kV

S & C

Mark III, Model PMH (with option G-7),
15-25 kV, 600 amp., three-phase
switching and 200 amp., single-pole
switching
Model PME-15-25 kV, Fully enclosed live
parts at all times, three-phase
switching and 200 amp single pole
switching

Trayer

800 Series, pad mounted three-phase vacuum
switching equipment, 200 and 600 amp.,
15-25 kV with or without fusing
501 submersible vacuum fuse enclosure,
deadfront 200 or 600 amp., 15-25 kV
Type SSA (submersible, fused and unfused)
200 and 600 amp., 15-25 kV

Note 1: Enclosures on this page must comply with the deadfront requirements
of REA Spec. U-4.

Note 2: Single-pole switching of three-phase underground circuits may cause
ferroresonance. Refer to REA Bulletin 61-3.

U hf - Jacketed Cable Restoration Kits
(For resealing concentric neutral wires after
installation of splices in jacketed underground cable.)

(When ordering, specify diameter of cable over jacket.)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Elastimold</u> PCS-1 Power Cable Seal	1341 (5/14/87)	To obtain experience.
<u>Homac</u> CNC Series Concentric Neutral Cover	1365 (6/23/88)	To obtain experience.
<u>Raychem</u> WCSM (Tubing Type) MWTM (Tubing Type) CRSM (Wraparound Type)	1354 (12/31/87)	To obtain experience.
<u>3M</u> HSJ Series (Heat Shrink) SJ Series (Cold Shrink)	1369 (9/8/88)	To obtain experience.

Conditional List

U hf(2)

July 1989

U hf - Terminator Sealing Kits
(For resealing concentric neutral wires after
installation of elbows or outdoor terminations
on jacketed underground cable.)

(When ordering, specify diameter of cable over jacket.)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Elastimold</u> 200 ECS Elbow Cable Shield, Cold Shrink	1356 (1/28/88)	To obtain experience.
<u>Homac</u> CNC Series Concentric Neutral Cover	1365 (6/23/88)	To obtain experience.
<u>Raychem</u> ESA, Heat Shrink	1354 (12/31/87)	To obtain experience.
<u>3M</u> 8450 Series, Cold Shrink	1336 (2/26/87)	To obtain experience.

U hf - Jacketed Cable Grounding Kits
(For connecting a grounding lead wire to the
concentric neutral wires and resealing the jacket.)

(When ordering, specify diameter of cable over jacket.)

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>3M</u> Model 2252 Cable Grounding Kit	1367 (7/28/88)	To obtain experience.

U hg
July 1989

U hg - Anti-tamper Shield

Manufacturer

Catalog Number

Cooper Power Systems (McGraw-Edison)

UM8Y1

Formed Plastics

7262 Series

U hj
July 1989

U hj - Bracket, combination arrester,
cutout and pothead mounting

Applicable Drawing: UM2, UM2A, UM2-4

<u>Manufacturer</u>	<u>Single Phase</u>	<u>Three-Phase</u>
Aluma-Form	1HCA-18-1PB Series	---
Cooper Power Systems (McGraw-Edison)	DC51B1	DC52B1

U hp-1
July 1989

U hp - Terminations, Elbow
(rated for switching on three-phase systems)

(When ordering, specify conductor size, type, whether
copper or aluminum and insulation diameter)

Manufacturer

Catalog Number

Cooper Power Systems (RTE)

15 kV, Loadbreak SBT IV
2604600B Series with test point
2604599B Series without test point
25 kV, Loadbreak SBT
2604740B Series with test point
2604741B Series without test point

Elastimold (ESNA)

15 kV loadbreak
Style 165LR, without voltage test point
Style 166LR, with voltage test point
Style 167LR, without voltage test point
Style 168LR, with voltage test point
25 kV loadbreak
Style 271LR, without voltage test point
Style 272LR, with voltage test point
Style 273LR, without voltage test point
Style 274LR, with voltage test point
35 kV loadbreak
Style 375LR, without voltage test point
Style 376LR, with voltage test point

General Electric

15 kV, Loadbreak 9U01A--4--Series
25 kV, Loadbreak 9U01B--5--Series

U hp - Terminations, Elbow
(rated for switching on three-phase systems)

(When ordering, specify conductor size, type, whether
copper or aluminum and insulation diameter)

Manufacturer

Catalog Number

Blackburn

15 kV, Loadbreak
JT2B (without test point)
JT2BT (with test point)
25 kV Loadbreak
JT2C (without test point)
JT2CT (with test point)

Joslyn

15 kV, Loadbreak
LBT112M (without test point)
LBT112TM (with test point)
25 kV, Loadbreak
LBT262M (without test point)
LBT262TM (with test point)
15 kV, Fused Loadbreak
SPF-T (with test point)

U hq-1
July 1989

U hq - Terminations, Multipoint

(Items on this page are rated for operation on three-phase systems
and may be used on single-phase systems.)

Manufacturer

Catalog Number

Blackburn

JJ2B10 (2, 3, 4-way) 15 kV

Cooper Power Systems
(McGraw-Edison)

15 kV

2-way, 3-way, & 4-way bushings

Series 2637172B with mounting bracket

Series 2637164C without mounting bracket

25 kV

2-way, 3-way, & 4-way bushings

Series 2637160B with mounting bracket

Series 2637166C without mounting bracket

Elastimold (ESNA)

15 kV

2-way bushing, 163J2

3-way bushing, 163J3

4-way bushing, 163J4

25 kV

2-way bushing, 271J2

3-way bushing, 271J3

4-way bushing, 271J4

35 kV

2-way bushing, 373J2

3-way bushing, 373J3

4-way bushing, 373J4

General Electric

15 kV

2-way bushing 9U07A--2-0

3-way bushing 9U07A--3-0

4-way bushing 9U07A--4-0

25 kV

2-way bushing 9U07B--2-0

3-way bushing 9U07B--3-0

4-way bushing 9U07B--4-0

U hq - Terminations, Feed-Through and Parking Bushings

Manufacturer

Catalog Number

Blackburn

15 kV

Feed-through, JFT2B10

Parking Bushing, J2PB

Elastimold (ESNA)

35 kV

Feed-thru, 373FT

Parking Bushing, 371SOP

General Electric

15 kV

Feed-through, 9U07AKF200

Insulated Parking Bushing, 9U07ACF100

Grounded Parking Bushing, 9U07AAF100

25 kV

Feed-through, 9U07BCF200

Insulated Parking Bushing, 9U07BCF100

Grounded Parking Bushing, 9U07BAF100

U hq-3
July 1989

U hq - Terminations, Multipoint
600 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Cooper Power Systems (RTE)</u>	15 kV and 25 kV 2-way, 3-way, and 4-way bushings Series 2604670B (with mounting bracket) Series 2601496C (without mounting bracket)
	35 kV 2-way, 3-way, and 4-way bushings Series 2637195C (with mounting bracket) Series 2637184C (without mounting bracket)
<u>Elastimold (ESNA)</u>	15 kV 2-way bushing, 650J2 or 675J2 3-way bushing, 650J3 or 675J3 4-way bushing, 650J4 or 675J4
	25 kV 2-way bushing, K650J2 or K675J2 3-way bushing, K650J3 or K675J3 4-way bushing, K650J4 or K675J4

U hr - Secondary tap or splice cover, submersible

<u>Manufacturer</u>	<u>Type or Catalog No.</u>
Blackburn	Type WDBS (#2 through #4/0) Type DBS (250 KCMIL through 1000 KCMIL)
Connector Mfg. Co.	Utilug Sure Seal
Elastimold (ESNA)	Style 86
Electrical Spec. Prod.	TSC Series
Homac	FSS Series
Kearney	Aqua-Seal Kit
Plymouth/Bishop	Splice-Wrap
3M	PST Series 8420

Heat Shrink Tubing (with sealant throughout)

<u>Manufacturer</u>	<u>Type or Catalog No.</u>
AMP	Black heat-shrink tubing
Electrical Spec. Prod.	HSH
Panduit	Heat shrink insulating cover
Raychem	WCSM cable sleeves
Sigmaform Corporation	Sigmaform heat-shrinkable products
3M	ITCSN tubular cable sleeve ICRS wraparound cable sleeve

U hv-1
July 1989

U hv - Cable, Underground
15 kV Cable

Applicable Specification: REA Specification U-1
Conductor: Copper or Aluminum - #2 AWG through 1000 kcmil
Insulation: Crosslinked (XLP) Polyethylene, Ethylene
Propylene Rubber (EPR), or Crosslinked
Polyethylene with Tree-retardant additives
(XL-TR)
Neutral: Copper Concentric Neutral
Jacket: High Molecular Weight Polyethylene

<u>Manufacturer</u>	<u>Insulation(s)</u>	<u>Flat Strap Neutral Available</u>
Cablec	XLP, EPR, XLP-TR	Yes
Conductor Prod.	XLP, XLP-TR	Yes
Hendrix	XLP, EPR, XLP-TR	No
Kerite	EPR	Yes
Okonite	XLP, EPR, XLP-TR	Yes
Pirelli	XLP, EPR, XLP-TR	Yes
Reynolds	XLP, EPR, XLP-TR	Yes
Southwire Furakawa	XLP, XLP-TR	No

*For grounding purposes insulated jacketed cables must be treated like overhead lines, i.e., at least four ground rods must be installed per mile in accordance with the NESC. (This does not include service grounds, etc., but does include equipment grounds.) Additional grounding may be necessary in soils with higher resistivity. In splices or tap connections, a good seal should be achieved to exclude moisture. It is recommended that any place that the jacketing is cut (including the connections to ground rods), it be done above ground in a pedestal.

U hv - Cable, Underground
25 kV Cable

Applicable Specification: REA Specification U-1
Conductor: Copper or Aluminum - #1 AWG through 1000 kcmil
Insulation: Crosslinked (XLP) Polyethylene, Ethylene Propylene Rubber (EPR), or Crosslinked Polyethylene with Tree-retardant additives (XLP-TR)
Neutral: Copper Concentric Neutral
Jacket: High Molecular Weight Polyethylene

<u>Manufacturer</u>	<u>Insulation(s)</u>	<u>Flat Strap Neutral Available</u>
Cablec	XLP, EPR, XLP-TR	Yes
Conductor Prod.	XLP, XLP-TR	Yes
Hendrix	XLP, EPR, XLP-TR	No
Kerite	EPR	Yes
Okonite	XLP, EPR, XLP-TR	Yes
Pirelli	XLP, EPR, XLP-TR	Yes
Reynolds	XLP, EPR, XLP-TR	Yes
Southwire Furakawa	XLP, XLP-TR	No

*For grounding purposes insulated jacketed cables must be treated like overhead lines, i.e., at least four ground rods must be installed per mile in accordance with the NESC. (This does not include service grounds, etc., but does include equipment grounds.) Additional grounding may be necessary in soils with higher resistivity. In splices or tap connections, a good seal should be achieved to exclude moisture. It is recommended that any place that the jacketing is cut (including the connections to ground rods), it be done above ground in a pedestal.

U hv-3
July 1989

U hv - Cable, Underground

600 Volt Cable

Applicable Specification: REA Specification U-2
Conductor : Copper, #4 AWG and larger
Aluminum, #2 AWG and larger
Insulation : Cross-Linked polyethylene (XLPE)

<u>Manufacturer</u>	<u>Type Conductor</u>
Alcan	Copper or Aluminum
Cablec	Copper or Aluminum
Collyer	Copper or Aluminum
Conductor Products	Aluminum
Essex	Copper or Aluminum
General Electric	Copper or Aluminum
Kaiser	Aluminum
Okonite	Copper or Aluminum
Phelps Dodge	Copper or Aluminum
Phillips Cables, Inc. (Marked "Phillips W")	Copper or Aluminum
Pirelli	Copper or Aluminum
Reynolds	Copper or Aluminum
Rome Cable	Copper or Aluminum
Southwire	Copper or Aluminum

NOTE: The manufacturers shown above have indicated that their 600 volt cable is suitable for use on 480 volt corner grounded delta circuits.

The above cable may be supplied with UL label for Type USE.

U hv - Cable, Underground

600 Volt Multi-Conductor Cable

Applicable Specification: REA Specification U-2
Conductor : Copper, #4 AWG and larger
Aluminum, #2 AWG and larger
Insulation : Cross-Linked polyethylene (XLPE)
Cable Configuration : 3 Insulated Conductors Triplexed

<u>Manufacturer</u>	<u>Type Conductor</u>
Alcan	Copper or Aluminum
Cablec	Copper or Aluminum
Conductor Products	Aluminum
Essex	Copper or Aluminum
General Electric	Copper or Aluminum
Kaiser	Aluminum
Okonite	Copper or Aluminum
Phillips Cables, Inc. (Marked "Phillips W")	Copper or Aluminum
Pirelli	Copper or Aluminum
Reynolds	Copper or Aluminum
Rome Cable	Copper or Aluminum
Southwire	Copper or Aluminum

The above cable may be supplied with UL label for Type USE.

U hw
July 1989

U hw - Warning sign

Applicable Specifications: REA Drawings UM12-1 and UM12-2

<u>Manufacturer</u>	<u>Size (inches)</u>	<u>Danger Sign Catalog No.</u>	<u>Caution Sign Catalog No.</u>
Brady*	7 x 10	46133	46043
	10 x 14	46131	46041
Eastern Metal*	7 x 10	REA 12-1-710	REA 12-2-710
	10 x 14	REA 12-1-1014	REA 12-2-1014
	14 x 20	REA 12-1-1420	REA 12-2-1420
	20 x 28	REA 12-1-2028	REA 12-2-2028
Electromark	7 x 10	REA-1-7x10-SV	REA-2-7x10-SV
	7 x 10	REA-1-7x10-AC	REA-2-7x10-AC
	10 x 14	REA-1-10x14-SV	REA-2-10x14-SV
	10 x 14	REA-1-10x14-AC	REA-2-10x14-AC
	14 x 20	REA-1-14x20-SV	REA-2-14x20-SV
	14 x 20	REA-1-14x20-AC	REA-2-14x20-AC
	20 x 28	REA-1-20x28-SV	REA-2-20x28-SV
	20 x 28	REA-1-20x28-AC	REA-2-20x28-AC
Lem	7 x 10	LSS-1400	LSS-1500
	10 x 14	LSS-1401	LSS-1501
	14 x 20	LSS-1402	LSS-1502
Lyle*	7 x 10	UM12-1-710	UM12-2-710
	10 x 14	UM12-1-1014	UM12-2-1014
	14 x 20	UM12-1-1420	UM12-2-1420
	20 x 28	UM12-1-2028	UM12-2-2028
May Advertising	7 x 10	MY710C	MY710B
	10 x 14	MY1014C	MY1014B
	14 x 20	MY1420C	MY1420B
	20 x 28	MY2028C	MY2028B
	For pressure sensitive decal add "D" prefix		
Truck Sign Service*	7 x 10	TSD-710	TSC-710
	10 x 14	TSD-1014	TSC-1014
	14 x 20	TSD-1420	TSC-1420
	20 x 28	TSD-2028	TSC-2028

*Reflective signs also available.

The signs listed on this page are to be secured to equipment and transformer enclosures by means of an adhesive or by welding. Screws and rivets are not to be used.

U hx
July 1989

U hx - Cable Route Marker

Manufacturer

Surface Mounted

Catalog Number

Chance

C554-0001

Above Grade

Carsonite

REA-100

Chance

C554-0183

Electromark

REA-3-4x7-SV
REA-3-4x7-AC
REA-3-5x12-SV
REA-3-5x12-AC

Lyle

UM12-712

May Advertising

MY45A
MY712A

For pressure sensitive decal add "D" prefix to catalog number.

Truck Sign Service

BCW-712

U hy-1
July 1989

U hy - Splice, Underground, Permanent

(when ordering, specify conductor size, type, whether
copper or aluminum and insulation diameter)

Manufacturer

Catalog Number

Blackburn

Type S4B (15 kV)

Type S4C (25 kV)

Elastimold (ESNA)

15 kv

Style 1500S, straight splice, through #1/0

Style 25-S, straight splice, #2/0 through
#4/0

Style 15PCJ-1, straight splice, through 4/0

Style 25-Y, Y-splice

25 kv

Style K-25-S, straight splice

Style K-25-Y, Y-splice

Style 25PCJ-1, straight splice, through 4/0

35 kv

Style M-250-S, straight splice

Joslyn

Type PMS152 Straight Splice (15 kV)

#4 through #1/0

3M

Quick Splice/Quick Splice II, 5400 Series
(15, 25, and 35 kV)

15 kv

5411R cable repair splice

5411R/HSJ-1 cable repair splice (for
jacketed cable)

U hy - Splice, Underground, Permanent

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Cooper Power Systems (RTE)</u>	15 kV 2637858B Series straight splice (#2 thru #4/0 stranded) 25 kV 2606825A Series straight splice 35 kV 2603934B Series straight splice
<u>General Electric</u>	15 kV Straight Splice through #1/0, Model 9U16A-100 "Uni-Matic" Through #2/0, Model 9U06A 25 kV "Uni-Matic" Through #2/0, Model 9U06A
<u>Raychem</u>	15 kV HVS 1510-R_____ 200 Amp Splice kit 25 kV For Bare Concentric Neutral Cable: HVS-2510-REAX in-line joint HVS-2510E-R-REAX repair joint For Jacketed Cable: HVS-2510-JCN-REAX in-line joint HVS-2510E-RJ-REAX repair joint 35 kV For Bare Concentric Neutral Cable: HVS-3510E-REAX in-line joint For Jacketed Cable: HVS-3510E-JCN-REAX in-line joint
<u>Sigmaform</u>	15 kV SSK Series (Heat Shrink)

U hy-2
July 1989

U hy - Splice, Underground, Separable

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

Manufacturer

Catalog Number

Elastimold (ESNA)

15 kV

Style 151-SR, receptacle
Style 151-SP, plug
Style 150-DP, deadend plug
Style 150-DR, deadend receptacle
Style 150-T, T-tap

25 kV

Style K-151-SR, receptacle
Style K-151-SP, plug
Style K-150-DR, deadend receptacle
Style K-150-T, T-tap

U hy - Splice, Underground, Permanent

(When ordering specify conductor size, type, whether
copper or aluminum and insulation diameter)

600 Ampere Continuous Current Rating

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Blackburn</u>	15 kV - S65B Straight splice 25 kV - S65C straight splice
<u>Cooper Power Systems (RTE)</u>	15 kV 2604904B Series straight splice (MPS-600) 25 kV 2604905B Series straight splice (MPS-600)
<u>Elastimold (ESNA)</u>	15 kV Style 650-S, straight splice Style 15PCJ-2, straight splice, through 1250 MCM Style 650-Y, Y-Splice 25 kV Style K650-S, straight splice Style K650-Y, Y-splice Style 25 PCJ-2, straight splice, through 1250 MCM 35 kV Style M650S, straight splice

U ja-1
July 1989

U ja - Transformer Pad

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Armorcast</u>	600 Series*, Polymer Concrete
<u>Associated Plastics</u>	API 4000 Series RPM
<u>Carolina Dielectrics</u>	Model 0502-1, Fiberglass, Size: 40" x 44"
<u>CDR Systems (Homac)</u>	TP Series*, Fiber reinforced polymer concrete
<u>Chance</u>	C107-0162 and C107-0171 Fiberglass, Size: 40" x 44"
<u>Diversitech</u>	TP Series - Fiberglass reinforced concrete
<u>Electri-Glass</u>	Fiberglass LP-4145, 41" x 45"
<u>Formex</u>	Model TP-REA, Molded polyethylene
<u>ICU, Inc</u>	Dwg. No. 730126-2, Molded polyethylene Size: 42" x 42"

*Order by catalog number and size.

U ja - Transformer Pad

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Heil Rotomold, Inc.</u>	T Series*, High density polyethylene
<u>Highline</u>	HL-46B, Fiberglass, Size: approx. 42" x 42"
<u>Major Frame-Crete</u>	ETPP precast, cellular concrete, 42" x 42"
<u>Nordic</u>	TP Series, Fiberglass
<u>Plastic Structures</u>	No. 40402012, Molded polyethylene, Size: 40" x 40"
<u>Quazite Corp.</u>	Composolite - PH Series
<u>Smith Cattleguard</u>	Easi Set T. Series, Precast Reinforced Concrete
<u>Thermodynamics</u>	Poly-Pad, PR Series*, Molded polyethylene

*Order by catalog number and size.

U ja-2
July 1989

U ja - Transformer Pad (Sleeve)

<u>Manufacturer</u>	<u>Catalog Number</u>
<u>Associated Plastics</u>	Transformer pad and box assembly, api 4242 RPM Pad and 1730 Box Transformer Pads, API 16 and API 45
<u>Concast</u>	Fibercrete modular bases
<u>D & L</u>	Fiberglass
<u>Electri-Glass, Inc.</u>	BP-2000
<u>Formex</u>	Transformer pad and box assembly TP-REA Series Pad 1730-A Series Box
<u>Highline</u>	Box pad HL-45A, Size: L-43", W-34-1/2", D-32"
<u>Maysteel</u>	CW-GS-P Series
<u>Nordic</u>	GS Series Fiberglass

*Order by catalog number and size.

U jb
July 1989

U jb - Splice Shield
(Refer to Drawing UM45-4)

Manufacturer

Catalog Number

Kellems

No. SE 594-2

Conditional List

U sc
July 1989

U sc - Regulators, voltage, pad-mounted
for underground distribution

12.5/7.2 kV

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Siemens-Allis</u> Single-phase, step-type pad-mounted regulator Type PFR (76.2, 114.3 & 167 kVA)	994 (6/29/72)	To obtain experience.

U sd
July 1989

U sd - Current Transformers
600 Volt

Direct Burial Type

<u>Manufacturer</u>	<u>Type or Catalog No.</u>
General Electric	JAL-O

Indoor Type for Pad-Mounted Transformers

<u>Manufacturer</u>	<u>Type or Catalog No.</u>
Astra	AP
General Electric	JAB-O
Sangamo	R6P
Westinghouse	CMV

U si-1
July 1989

U si - Anodes, Sacrificial
(Drawings UM11-1, UM26, UM27, M2-7, M2-17)

Zinc Anodes*

	<u>Pre-packaged With Connecting Wire</u>			<u>Bare Continuous Strip (Ribbon)</u>	
	<u>12 lbs.</u>	<u>30 lbs.</u>	<u>60 lbs.</u>	<u>5/8" x 7/8"</u>	<u>1/2" x 9/16"</u>
Cathodic Protection Services	12HII-4A	30HII-4A	60HII-4A		
Federated Metals	S-12 packaged	S-30 packaged	S-60 packaged	Regular Size Type II	Junior size
Harco	AZC12GJ	AZC30GJ	AZC60HJ		
Mesa	S-12 packaged	S-30 packaged	S-60 packaged	Regular Size	Junior size
Stuart	SZ-12 -----VIBROX packaged-----	SZ-30	SZ-60		

*When ordering, specify zinc anodes that meet ASTM B418-73 Type II Composition and REA Specification DT-9, "REA Specification for Zinc Sacrificial Anodes."

U si-2
July 1989

U si - Anodes, Sacrificial
(Drawings UM11-1, UM26, UM27, M2-7, M2-17)

Magnesium Anodes**

<u>Standard Potential</u>					<u>High Potential</u>			
	<u>17 lbs</u>	<u>20 lbs</u>	<u>32 lbs</u>	<u>50 lbs</u>	<u>17 lbs</u>	<u>20 lbs</u>	<u>32 lbs</u>	<u>48 lbs</u>
Cathodic Protection Services	17 packaged		32 packaged	50 packaged	17D3 packaged	20D2 packaged	32D5 packaged	48D5 packaged
Federated Metals	17 packaged		32 packaged	50 packaged				
Harco	AMC17J	AMC20J	AMC32J	AMC50J	AMC17G	AMC20G	AMC32G	AMC48G
Kaiser Mag.	17 Vibra Pak		32 Vibra Pak	50 Vibra Pak	17 Electromag Vibra Pak	32 Electromag Vibra Pak	50 Electromag Vibra Pak	
Mesa	17 packaged		32 packaged	50 packaged	17D Series	20D2	32D Series	48D5
Stuart	SM-17		SM-32	SM-50	SM-17H		SM-32H	SM-48H

**When ordering, specify magnesium anodes that meet REA Specification DT-10, "REA Specification for Magnesium Sacrificial Anodes."

PART III - GENERAL PLANT ITEMS

Explanation of Groups

- Group I Instruments in this classification are laboratory or shop standards, used for calibrating all other instruments. They are a precision type which demand the best of care. THEY ARE NOT FOR FIELD USE.
- Group II Instruments in this classification are high accuracy weatherproof portables, used for general field testing such as checking substations, voltage regulators or control equipment.
- Group III Instruments in this classification are weatherproof portables or semi-portables of the thermal type, used for checking substation balance, substation loading, transformer loading, feeder loading, feeder voltages and many consumer loads.
- Group IV Instrument in this classification are general purpose weatherproof portables with moderate accuracy, used for checking consumer loads and used where only moderate accuracy is required.

AMMETERS, INDICATING

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>	<u>Group*</u>
Biddle	50,000 Series	Thermal, max. pointer	III
General Electric	AK-4	Hook-on (volt-ammeter)	IV
	AK-5	Hook-on (volt-ammeter)	IV
HD Electric	"Max-I-Meter" (All Models)	Thermal ammeters	III
Multi-Amp	115	Volt-Amp-Wattmeter	II
	125	Volt-Ammeter	II
	135	Portable, general field testing	II
Sangamo	ADS	Thermal, max. pointer, socket mount	III
TIF Instruments	PP1000	Hook-on (volt-ammeter)	IV
Westinghouse	PA-141	Volt-Ammeter	II
	PA-151	Volt-Ammeter	II
	PA-161	Volt-Ammeter	II
Weston	370	Reference portable standard	I
	433	Portable, general field testing	II
	633	Hook-on (volt-ammeter)	IV
	904	Portable, general field testing	II

*Refer to "Part III - General Plant Items" for explanation of groups.

AMMETERS, RECORDING

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>	<u>Group*</u>
Esterline-Angus	A	Ink, strip, motor or clock, portable	II
General Electric	CH-3	Ink, strip, motor or clock, portable	II
	CH-4		IV
	CH-7	Ink, strip, motor or clock, portable, with 15 kV CT	IV
	CF-1	Inkless, strip, motor drive, portable	IV
	CF-7	Inkless, strip, motor drive, portable, with 15kV CT	IV
Sangamo	CCA Series	Thermal, ink, circular motor or clock, portable, pole or socket mount	III
Westinghouse	44	Ink, strip, motor or clock, portable	II
	45	Ink, circular, motor or or clock, portable	IV

* Refer to "Part III - General Plant Items" for explanation of groups.

VOLTMETERS, INDICATING

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>	<u>Group*</u>
Multi-Amp	145	Portable, general field testing	II
Westinghouse	A-141	Volt-Ammeter	II
	PC-141	Portable, general field testing	II
	PA-151	Volt-Ammeter	II
	PC-151	Portable, general field testing	II
	PA-161	Volt-Ammeter	II
	PC-161	Portable, general field testing	II
Weston	341	Reference portable standard	I
	433	Portable, general field testing	II
	904	Portable, general field testing	II

*Refer to "Part III - General Plant Items" for explanation of groups.

VOLTMETERS, RECORDING

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>	<u>Group*</u>
Esterline-Angus	A	Ink, strip, motor or clock, portable	II
General Electric	CH-3	Ink, strip, motor clock, portable, single range	II
	CH-3	Ink, strip, motor or clock, portable, expanded range	II
	CH-4	Ink, strip, motor or clock, portable, multi-range	II
	CF-1	Inkless, strip, motor drive, portable	IV
Sangamo	CCV Series	Thermal, ink, circular motor or clock, portable, pole or socket mount	III
Westinghouse	44	Ink, strip, motor or clock, portable	II
	45	Ink, circular, motor or clock, portable	IV

* Refer to "Part III - General Plant Items" for explanation of groups.

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July 1989

WATTMETERS, INDICATING

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>	<u>Group*</u>
Multi-Amp	155	Portable, general field testing	II
Westinghouse	PY-5	Portable, general field testing	II
Weston	432	Portable, general field testing	II
	310	Portable, standard	II
	905	Portable, general field testing	II

*Refer to "Part III - General Plant Items" for explanation of groups.

WATTMETERS, RECORDING

Esterline-Angus	A	Ink, strip, motor or clock, portable	II
General Electric	CF-8	1Ø watt-var, inkless strip, motor, portable	IV
	CH-3 CH-4	Ink, strip, motor or clock, portable	II
	CH-11	3Ø watt-var recorder, ink or inkless, portable, motor or clock.	II
	CF-11	3Ø watt-var recorder, inkless, portable, motor	IV
Sangamo	CCW Series	Thermal, ink, circular, motor or clock, portable, pole or socket mount	III
Westinghouse	44	Ink, strip, motor or clock, portable	II

*Refer to Part III - General Plant Items for explanation of groups.

GP-7
July 1989

Revenue Metering Test Equipment

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>	<u>Group*</u>
Eastern Specialty	1012	Current tranformer field test kit	II
	990A	Meter test board	I
	G-50	Meter test kit	II
General Electric	IB-10	Portable standard	II
Knopp, Inc.	CL-6	Loading Transformer	II
	TE-14	Watthour meter testing equipment	I
	ST-15	Automatic watthour meter test system	I
	ST-31	Automatic three-phase watthour meter test system	I
	KCTS	Current transformer testing system	I
	KVTS	Voltage transformer testing system	I
Sangamo	J-33	Portable standard	II
	J-44		II
States Company	HAPBL	Watthour meter test table	I
	150	Photoelectric watthour meter tester	I
	KFLD	Meter test kit	II
	FDM	Demand meter test table	I

*Refer to "Part III - General Plant Items" for explanation of groups.

Conditional List
GP(7)
July 1989

GP - Revenue Metering Test Equipment

<u>Manufacturer</u>	<u>Meeting No. and Date</u>	<u>Conditions</u>
<u>Knopp, Inc.</u> "Uniload" Portable Test Set FS-9	1287 9/27/84	To obtain experience.

RESISTANCE TESTS SETS

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>	<u>Group*</u>
Associated Research	255A	Ground resistance	IV
	263A	meter (vibroground)	IV
	2101A	Ohmmeter, insulation resistance tester	IV
Biddle	21159	Ohmmeter, insulation resistance tester	IV

*Refer to "Part III - General Plant Items" for explanation of groups.

*DC Voltmeter with Built-In Half Cell

<u>Manufacturer</u>	<u>Type</u>	<u>Description</u>
Electronics Systems Design	CP600	Corrosion Potential Meter (0 to 1.999 volts dc digital)

*Corrosion test instrument - DC potential

